DOCUMENT RESUME

ED 183 739 CE 024 117

AUTHOR Gardner, David C.; And Others
TITLE Vocational Curriculum Modification. Teaching Technical Language to Learning Handicapped Students. Project HIRE: A Curriculum Management System for Instructing the Handicapped. Final Report, Volume 1.
INSTITUTION Boston Univ., Mass. School of Education.
SPONS AGENCY Office of Education (DHEW), Washington, D.C.
BUREAU NO 498AH70309
PUB DATE Sep 79
GRANT G007701947
NOTE 129p.; For related documents see CE 024 118, CE 024 406-424, and CE 024 740. Best copy available.

EDRS PRICE MF01/PC06 Plus Postage.
DESCRIPTORS *Autoinstructional Aids; Evaluation; *Individual Instruction; Information Dissemination; *Instructional Materials; Learning Activities; *Learning Disabilities; Mainstreaming; Material Development; Remedial Instruction; Secondary Education; Student Evaluation; Teaching Guides; Vocabulary; *Vocabulary Development; *Vocational Education
IDENTIFIERS Project HIRE

ABSTRACT

Volume 1 of the final report on Project HIRE reports the design, development, field-testing, and refining of self-instructional packages to teach entry level technical vocabulary to learning handicapped students mainstreamed in vocational programs. Volume 2, a management handbook, reports the methods and findings concerning development of strategies and standards for developing materials (see Note). Following an introduction to the project (chapter 1), chapter 2 describes development of the fifteen teaching booklets and five teacher's manuals in five trade areas (allied health, arc welding, culinary arts, graphic arts, and upholstery) through these steps: selection of 120-160 words per area, ordering them into three areas (tools, concepts, process) which produced booklets per area, writing definitions for a fourth-grade reading level, and designing a drawing representative of the term. (See Note for availability of these mateials.) Examples include definitions and illustrations and additional learning aids developed by the project (activity sheets and check-ups). Chapter 3 outlines the evaluation of the materials through pre- andpost-testing using the nonequivalent control group design and vocabulary tests. Findings indicate that the materials are an effective and economic way to teach the vocabulary. Chapter 4 describes dissemination activities. A sample teacher's manual and sample booklet pages are appended. (YLB)

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VOCATIONAL CURRICULUM MODIFICATION

Teaching Technical Language to Learning Handicapped Students

David C. Gardner
Grace Joely Beatty
Sue Allen Warren

Project HIRE: A Curriculum Management System for Instructing the Handicapped, USOE
Project No. 498AH70309, Grant No. G007701947

CE024117

FINAL REPORT
Volume I

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Boston University School of Education
Department of Business and Career Education
September, 1979

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ACKNOWLEDGEMENTS

Every project begins somewhere with an idea. Sometimes this idea leads to many more ideas. When the idea(s) is viable, the result is a project of this scope. We acknowledge gratefully all of those who contributed to the successful completion of this project and whose ideas were adopted, tested and refined, or whose ideas led us to finding a better way. We apologize for any errors of omission and express our thanks to those who cannot be named here.

We wish to acknowledge especially the person who gave the senior author the basic idea which led to the development of the Project HIRE curriculum modification approach. Not only did Dr. Margaret A. Kurtz first suggest the illustration-definition training book approach used in our project to teach technical language, but she worked closely with the senior author for two years in the earlier developmental stages of Project VITA (1975-77). Moreover, she was a key figure in the development of the proposal which led to funding the current project. Lastly, Professor Kurtz has been an inspiration to the management team in getting the job done with a smile.

We are deeply indebted to all the teachers, administrators, and other professionals who participated. Their names are listed elsewhere in this report. Finally, we thank the students who let us help them learn these words.

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CHAPTER 1

INTRODUCTION TO CURRICULUM MODIFICATION

Overview

The world of work as an institution in America has undergone incredibly broad and far-reaching changes in the past fifty years.

> Against the broad sweep of this country's occupational history, its proud tradition of economic accomplishment and technological advancement, the contributions of special groups of workers--notably women, minorities and the handicapped--have been obscured by almost exclusive focus upon the salience and success of able-bodied, white males. (Crites, 1975)

The last ten years have witnessed numerous changes in the conditions and opportunities for employment and education of minorities and women. For the handicapped student, progress has also been made, but at a slower pace. At this writing the concerns of vocational teachers and potential employers are congruent. How do I modify the training and/or work environment to enhance the success of the handicapped student or worker? What adjustments do I have to make in my supervision to accommodate the worker/student who has a disability? What is the work potential of the particular handicapped worker/student and what is a "reasonable" accommodation? These and many other questions are representative of the current "state of the art" in many schools and at many job sites.

For the handicapped student to be a successful member of our society, it is necessary that we afford him/her the opportunity to gain a "stake in the community." A stake in the community means successful employment. Successful employment, while it may require some modification in the job on the part of the employer, really means appropriate vocational preparation. The responsibility for such preparation rests not only on the shoulders of vocational educators but equally on the shoulders of those who advocate for and claim expertise about the handicapped student. Project HIRE was born out of the idea that successful vocational training of handicapped students should be the shared responsibility of all teachers and ancillary personnel, and not just the responsibility of the specific vocational teacher. It was founded also on the idea that special education personnel, vocational education teachers, and university specialists could work together to make it possible for learning handicapped students to be successful in vocational education while learning alongside their normal peers (Gardner & Kurtz, 1979a, 1979b).

Vocational Mainstreaming in Perspective

Wolfensberger (1972) defines the "normalization principle" as a method or means ". . . to establish and/or maintain personal behaviors and characteristics which are as culturally normative as possible" (p. 28). What he means is that when one applies the "normalization principle" to the total life style of a mentally retarded person, one should use as a rule of thumb the notion that facilities provided, educational programming, social activities, etc. for these clients

should emphasize providing a normal environment for them. While there is some controversy over what the words "normal" and "normalization" mean (see Warren, 1973), the principle of normalization is ". . . gaining momentum throughout the country" (Brolin, 1976, p. 37). Moreover, mainstreaming in the public schools is congruent with the normalization principle (Brolin, 1976).

In other words, when one applies the normalization principle in the public school one "mainstreams." Simply stated, mainstreaming is a deliberate and conscious application of the normalization principle in public schools. It places emphasis on placement of handicapped students into the least restrictive educational program which is appropriate to their needs.

Thus, from an administrative perspective, mainstreaming can be viewed as a management system. The management system's problems consist of answering the following two questions about each handicapped student and providing the services related thereto:

1. What is the least restrictive educational program for this student?
2. What support services need to be given this child to ensure that he/she can be educated in the least restrictive environment?

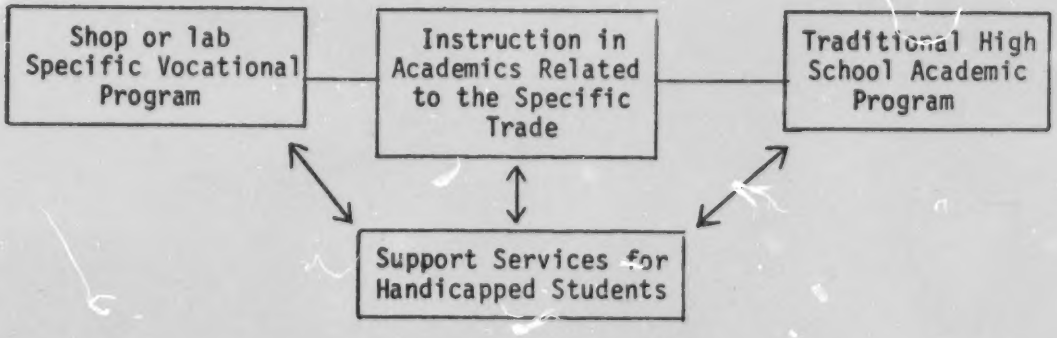
Mainstreaming, contrary to the beliefs of many, does not ". . . mean that every handicapped student must be placed in regular classes full time" (Dahl, Appleby and Lipe, 1978). What it means is that the school must provide supportive services, supplemental instructional programs and other part-time services to help individual students

"learn alongside their normal peers." Moreover, for mainstreaming programs to be effective, they must be sensitive to the needs of individual teachers. Placing a student in a program without adequate support services, without providing the teacher with additional training and without an adequate budget for curriculum and equipment modifications, is a ludicrous situation. Yet this remains a fear for most teachers.

In vocational schools, the problems associated with mainstreaming go beyond those of the typical high school without vocational programs. In a regular high school, where numerous psychological, medical and social services may be provided, the bulk of the expenditures for supportive services center on academic instructional support. That is, the focus is on helping the handicapped student in his academic program.

In most vocational schools, the problems of mainstreaming are multiplied by the uniqueness of vocational education's delivery system and its instructional objectives. In addition to being concerned about the delivery of traditional high school academics, the vocational school must also provide support services for the shop or laboratory portion of the program as well as for the trade related instruction:

Typical Vocational Program


Shop or lab Specific Vocational Program
Instruction in Academics Related to the Specific Trade
Traditional High School Academic Program
Support Services for Handicapped Students

For mainstreaming systems to be effective in vocational education, the management system must support the three major instructional programs illustrated above. That is, provisions must be made in the management system to support both traditional academic instruction and the vocational training program. An effective vocational mainstreaming program should include the following:

1. Vocational teachers must be provided with appropriate inservice training which will help them acquire more positive and appropriate attitudes towards handicapped students.

2. Vocational teachers must be provided with additional information about the vocational potential and capabilities of individual handicapping conditions.

3. Vocational schools must provide services and personnel who can assess the vocational potential of a handicapped student, listing both the vocational assets as well as limitations. Assessment must be made in such a way that the findings can be translated into meaningful educational and vocational programming.

4. Vocational schools must develop their own IEP program and referral system to maximize the vocational education of the individual handicapped student.

5. Vocational schools must provide physical access to the facility for all handicapped students. This may require modifications in the actual building, including ramps, etc. for the physically handicapped.

6. Vocational schools must provide special equipment and modifications in the vocational curriculum to accommodate the handicapped student.

7. Ancillary personnel, special education personnel and vocational instructors must work together to accomplish these goals.

Project HIRE, within the context of curriculum development and curriculum management, was concerned with the last two items.

Project Objectives and Overview of Volume I

The major objective of Project HIRE, "a curriculum management system for instructing the handicapped," was to:

> Design, develop, field-test, and refine curriculum and instructional materials for use in the resource room to support vocational instruction received by handicapped students who are integrated into regular vocational training programs in the four regional schools collaborating on this project.

The major efforts of the Project, both in terms of funds allocated and the professional time expended by the project personnel, were on the actual development and field testing of the materials. In fact, the project went beyond the parameters established in the original proposal by producing 15 teaching booklets instead of 12, five teacher's manuals instead of four, and adding an additional topical area.

Chapter 2 of this volume describes the process used to develop these materials. Examples of the definitions and illustrations are included and a sample of a teacher's manual is contained in the Appendix. Chapter 3 describes the procedures used in the evaluation of the materials and reports the findings of the field testing

and implications. Dissemination activities are described in Chapter 4.

In addition to the objectives concerned with materials development, refinement, and field testing as well as dissemination, the Project also had two additional objectives:

> To develop and test new strategies for utilizing teams of vocational education and special education personnel, supported by university specialists, in the planning, development, and testing of curriculum and instructional materials for use by handicapped students in resource rooms.
>
> To design, develop, and test new standards (strategies established by teams as part of objectives above) for developing quality curriculum materials for use by handicapped students who are enrolled in regular vocational programs.

The methods and findings concerning these two objectives are reported in Volume II of the Final Report entitled Practical Approaches to Curriculum Development: A Management Handbook. Again, as in meeting the major objective, the Project went beyond the "call of duty." The original proposal called for the findings of these two objectives to be reported in a small brochure. Instead, the Project produced the management handbook (Volume II).

CHAPTER 2

PRODUCTION OF THE MATERIALS

Project HIRE was designed to develop vocational education materials for learning handicapped students mainstreamed in vocational programs. In order to produce materials that would have equal validity for vocational educators and special educators, interdisciplinary teams were formed at each of the participating schools. Each team included two vocational educators, two special educators, and the school's director of special education. This team worked closely with University personnel in the selection of vocabulary in each of the areas and in the development of the modules.

An unstated agenda in the composition of the teams was the establishment of an ongoing, informal communication system between vocational education and special education teachers in each of the participating schools. This was accomplished by setting up teams whose members became accustomed to working cooperatively on shared curriculum development goals. It was hoped that these teams would continue to work together and that they would serve as models for future development of similar materials in other trade areas once Project HIRE had finished.

Selection of Trade Areas

Each participating school chose the trade area they wished to work in. The selection of the trade areas was based on the following

criteria:

1. The trade area in the particular school should have a good placement record for learning handicapped students.

2. The vocational area should be one in which learning handicapped students were having difficulty mastering essential vocabulary.

3. At least one vocational teacher from the chosen trade area was willing to participate in the Project.

Based on the above criteria, the following vocational areas were chosen by each of the participating schools:

Area	School
Allied Health	Minuteman Regional Voc-Tech School Lexington, MA
Arc Welding	Keefe Regional Voc-Tech School Framingham, MA
Culinary Arts	Whittier Regional Voc-Tech School Haverhill, MA
Graphic Arts	Blue Hills Regional Voc-Tech School Canton, MA
Upholstery	Whittier Regional Voc-Tech School Haverhill, MA

The team from Whittier Regional actually chose to work in two separate trade areas. There were two vocational teachers who were very excited about the Project and who wanted to become involved, even though it meant that each of them was responsible for an entire trade area. The special education teachers on the Whitter team were also willing to do, in effect, twice the amount of work required, since they were also working on two different areas.

Selection of Vocabulary

Since there are literally hundreds, if not thousands, of technical terms in each of the trade areas, it was decided, initially, that the best approach to vocabulary selection would be to deal with entry-level terminology. Logically, it was apparent that students would have to know entry-level terminology before they could progress to more advanced vocabulary. Students would also go into entry-level positions upon graduation from high school and would not be able to progress on the job if they could not function well in their beginning positions.

Once the decision to focus on entry-level terminology was made, appropriate job descriptions were selected from the Dictionary of Occupational Titles. These positions were validated by the vocational teachers' professional judgements as entry-level and the terminology selected, therefore, was on the basis that the word was necessary for successful job entry.

Organization of Modules

The selection process enabled each team to choose 120-160 entry-level technical terms in their area.* It was then necessary to organize the words for each trade area into manageable formats. Initially, the words were to be organized by jobs. However, this approach resulted in a tremendous repetition of terms since there is great cross-over in required tasks at the entry level. For example,

---

*For a lengthy discussion of the problems in validating words on the basis of usage and entry-level status, see pages 39 to 51 in Volume II of the Final Report.

the same tools are used in a number of different tasks, and with this format, the tool would have to be defined every single time. Since students usually have a limited amount of resource room time, it was decided that a more efficient organization was required.

An analysis of the terms selected by each team indicated that there seemed to be three types of words: (1) tools, (2) concepts, and (3) process words. Another early organizational approach was to put all the tools together, all the concept words together, and all the processes together. However, it became apparent very quickly that it made more sense to include certain tools with the process they were used with. Consequently, the organization of each trade area was done on an individual basis. For example, Culinary Arts was divided into the following sections:

Culinary Arts

Module No.	Lesson No.
I. Activities	1. Cutting 2. [illegible]ing 3. [illegible] 4. [illegible]g
II. Cooking	5. [illegible] 6. [illegible]ve Cooking 7. Storage 8. Frying and Sautéing 9. Baking
III. Foods	10. Soups 11. Vegetables 12. Sauces 13. Meat and Fish 14. Desserts

In this particular trade area, the words were organized into "Activities" in the first booklet, elementary cooking processes in

the second booklet, and basic foods in the third booklet. Since the entry-level jobs in Culinary Arts involve kitchen help or waiter/waitress activities, it was obvious that students would need to master the vocabulary for those areas.

In contrast, the entire first booklet in Arc Welding was concerned with safety. When one considers the acetylene torches, molten metal, and the other dangerous equipment in an arc welding shop, this format was particularly appropriate. The booklets in Arc Welding were divided into the following areas:

Arc Welding

Module No.	Lesson No.
I. Safety	1. Inner Garments 2. Outer Garments 3. Operation of Equipment 4. Work Environment 5. Hazards
II. Equipment/Tools/ Materials	6. Equipment 7. Electrode Code 8. Welding Tools 9. Welding Materials
III. Standard Arc Weld Types	10. Groove Welds 11. Areas of Measurement 12. Measurement Tools 13. Welding Symbols

The words in each area were divided into three booklets because 120-160 words in one booklet would make a rather intimidating list for a learning handicapped student. The order of the words within booklets was determined by teaching order and a number of eclectic learning principles, such as:

1. Learning is faster if materials are meaningful to students.
2. Learning is maintained best if the material learned is used soon after it is first learned.
3. For acquiring facts, learning is faster and retention is improved if learning practice is distributed during the learning cycle rather than crammed.
4. Clustering facts to be learned improves the student's ability to retain the facts.
5. Immediate feedback on the correctness of a response aids in the mastery of the new terms or facts.
6. Presenting materials in an easy-to-hard sequence improves learning speed.
7. Overlearning and reviewing facts helps retention.
8. If the student knows part of the task prior to attempting the entire task, he/she can learn better.

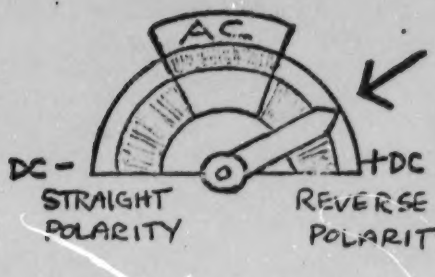
Developmental Criteria

Once the order of the words was determined, the definitions were rewritten to a fourth-grade reading level using the Dale-Chall reading formula and the Dale List of 3000 Familiar Words. By constantly consulting the Dale List and substituting acceptable words for more technical terms, a fourth-grade reading level was achieved. This particular step proved to be more difficult than it first appeared. For instance, words like "DC reverse polarity" in arc welding involve highly technical concepts that cannot be translated into fourth-grade terminology easily. In this particular term, no attempt was made to explain theories of electricity or to give any background to the term. A very elementary definition and an explanation of the effects were included in the rewritten definition:

> DC reverse polarity is the kind of electric current that is most often used in arc welding. When you use DC reverse polarity, the electrode is hotter than the work piece.

This term also illustrates the importance of "teaching order" in the organization of terms. The terms "current" and "electrode" had to be defined before "DC reverse polarity," since both words are in the final definition.

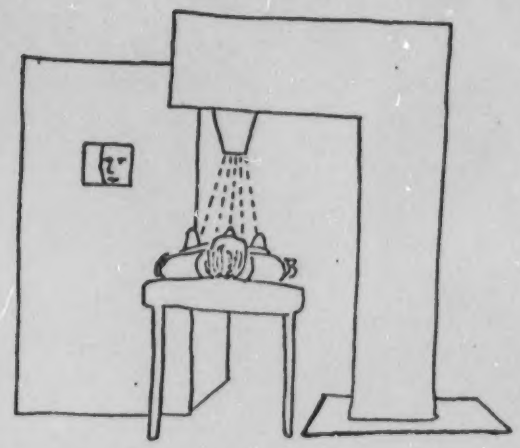
It is also a good example of a continuing problem in the development of the materials: appropriate line drawings. The term "DC reverse polarity" denotes a very technical concept, and finding a single line drawing that adequately illustrated this concept required numerous trials. The real challenge lay in designing a drawing that was representative of the term yet was uncluttered enough for learning handicapped students. The final drawing and definition, as shown below, represent the best compromise. The picture represents the dial on the arc welding machine that would have to be turned to DC reverse polarity. The welding teacher would have to demonstrate <u>how</u> to turn the dial. These materials do not attempt to teach <u>how</u> to perform tasks; they are meant to reinforce the vocabulary involved.



DC reverse polarity

DC reverse polarity is the kind of electric current that is most often used in arc welding. When you use DC reverse polarity, the electrode is hotter than the work piece.

Another trade area that had numerous abstract concepts was Allied Health. A common entry-level job in that area is transportation aide. This job requires that a student know a number of terms that identify specific departments in a hospital, i.e., audiology department, opthalmology department, cardiology department. The development of effective illustrations of these terms proved to be quite difficult and time-consuming. One example, in which the artist was able to design a drawing that seemed to best illustrate the concept yet maintained some simplicity, was "x-ray department," as follows:



x-ray department

The x-ray department is where x-rays (pictures of the insides of thebody) are made.

A term which presented another type of illustrative-design problem was "cardiology department." The artist used the common "valentine" heart to depict the meaning of cardiology. There was some discussion over whether this was not a "misrepresentation," since it was not technically accurate. It was decided, however, that the use of the technically accurate picture of the heart organ presumed prior knowledge on the part of learning handicapped students that was unlikely. Thus, communication was considered more important than technical accuracy.*

*A note to the reader: One similar problem that never was resolved to our satisfaction was the term "urology department." Total communication yielded to technical accuracy since the team couldn't arrive at an acceptable alternative to the kidney organ illustration!

cardiology department

The cardiology department is where people with heart trouble get help.

An additional illustration problem was how to represent "size" concepts. In Culinary Arts, for example, there were a number of terms of this nature. In the lesson on Cutting, "chop," mince," and "dice" all refer to cutting procedures. They differ only in the size of the finished products. The original definitions differentiated sizes by categorizing "chop" as large pieces, "dice" as medium-sized pieces, and "mince" as very small pieces. An inherent problem with these descriptions is that small, medium, and large are relative terms; that is, they might mean different things to a 6'2" student and a 5'1" student. Thus, it was necessary to include in the definitions size comparisons to items with which the students would be familiar. An

example of "mince" follows:

mince

Mince means to chop food into very small pieces no bigger than a grain of rice.

Another type of size problem was in writing definitions for the variety of knives in Culinary Arts. A major distinguishing feature of the different knives is the length of the blades. Since learning handicapped students frequently have trouble discriminating 4" versus 6", an alternate measurement system was needed. Consequently, the length of each knife was defined in relation to a common item rather than in inches. For example:

> A paring knife is used to cut skin off fruits and vegetables. The blade of a paring knife is about as long as a new piece of chalk.

A french knife is used to slice, chop, mince, and dice. The blade of a french knife is about the size of a long box of kleenex.

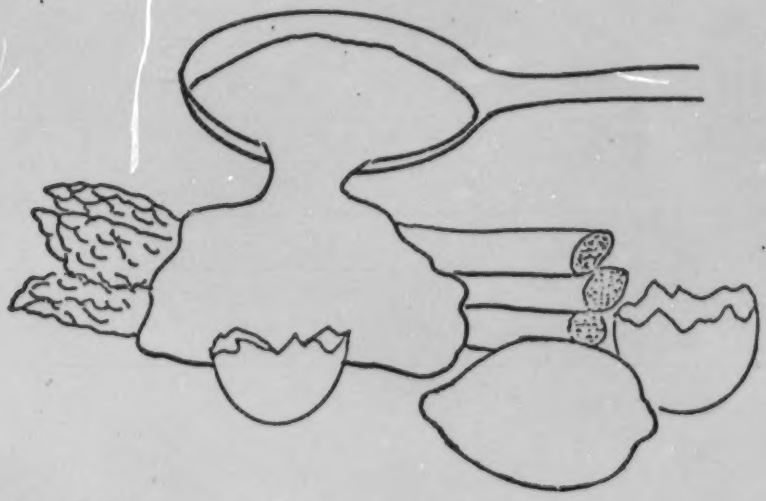
An example of the dictionary page for "boning knife" follows:

boning knife

A boning knife is used to remove meat from the bone. The blade of the boning knife is as long as a dollar bill.

All the drawings were in black and white because of the cost of having artists draw in color and the additional expense of duplicating in color. The only area in which this posed a problem was in Culinary Arts, a very visually-oriented area. Without the use of color, an egg is not a great deal different from a lemon in terms of shape and size. The minor differences in appearance could be overlooked by a learning handicapped student quite easily. The lack of color as a discrimination dimension was keenly felt in the lesson on sauces, since the major different in the basic sauces is color. We overcame this problem

by referring to the color of the sauce in the definition, showing one or two of the major ingredients on the page, and showing the sauce being spooned over a food it would normally be served with. The definition and illustration of "hollondaise sauce" follows:



hollandaise sauce

Hollandaise sauce is a yellow egg sauce made from egg yolks, lemon juice, and butter. Hollandaise sauce is put on eggs, vegetables, and fish.

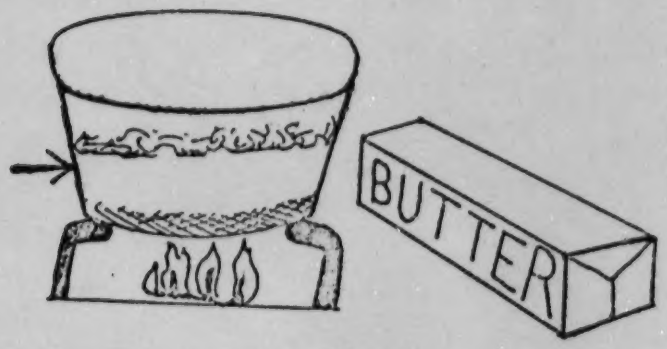
The third category of word which was referred to earlier was the "process" word. Each of the trade areas had terms which denoted a series of steps, such as "clarify" in Culinary Arts. Clarify means to make clear and is actually a series of steps. In clarifying butter, for instance, you (1) melt the butter, (2) a sediment of salt and

other additives drops to the bottom, (3) a foam forms on the top, and (4) clear liquid is left in the middle. You then (5) skim off the foam, (6) drain off the clear liquid, and (7) throw out the sediment.

The fact that this is a multi-step process posed problems for developing both the definition and the drawing. One of the a priori criteria for module development required only one illustration per term, since learning handicapped students are easily distracted by too many stimuli. Thus, it was essential that the illustration capture the major concept of the term even though it was not possible to show the entire process. This required numerous "drafts" in order to maintain the technical accuracy while at the same time meeting the learning needs of the students.

The definition of a term such as clarify also required special attention. The definitions did not attempt to give a detailed description of how to perform the process. They were written to focus on the major component of the process and to help the student remember that component. It is incumbent upon the Culinary Arts teacher to show the student how to clarify butter. A further restriction was imposed on the size of the type and the size of the page. All definitions were done in primary type to increase the readability and to help those students who might have visual problems. Only one word, definition, and illustration were put on a half-sized page to avoid the problem of too much stimuli that was discussed earlier. This meant that the definition was limited to a maximum of 7-8 lines and 3 to 4 simple sentences.

The illustration and definition of "clarify" follow:



clarify

Clarify means to make a liquid clear. When you clarify butter, you heat the butter and then take out the cloudy part and keep the clear part.

In summary, the criteria for the definitions and illustrations used in the Project HIRE materials were:

1. Fourth-grade vocabulary
2. Primary type: 3 to 4 simple sentences
3. Half-sized page
4. One line drawing per term
5. Black and white drawings

Development of Additional Learning Aids

In addition to the teaching booklets containing the vocabulary, students also had access to a cassette tape for each lesson. Lessons were put on individual tapes so that students did not have to hunt for the beginning of a lesson on a longer tape. Since approximately 20% of the students using the materials had less than a fourth-grade reading level, it was felt that the addition of an audio tape would enhance their learning. All of the directions for use of the materials as well as the definitions themselves were recorded on the tape for each lesson. The resource room teachers involved in the study reported that all students were able to use the materials independently after an initial demonstration by the teacher.

The materials also included flash cards, color coded to the booklet covers. The flash cards were heavy poster board and were numbered to correspond to the page numbers in the booklets. After the student had gone through the lesson in the booklet with the tape, the directions guided him to the flash cards. The student then went through the flash cards checking himself on the definitions after looking at the word and illustration. The materials are self-instructional and are geared for success. If the student did not know all the definitions with the flash cards, he was able to go back to the booklets and review. Only after the student was 100% correct on the flash cards was he supposed to go on to the Activity for that particular lesson. The Activity was also designed as a student aid and was meant to reinforce the concepts learned. The Activity Sheets contained miniaturized copies of the illustrations in the booklets. They had,

essentially, the same structure as the flash cards except that the student now had to match the correct definition and word/illustration. This was also self-paced, and the directions told the student to go back to the booklet and tape if he/she did not get 100% on the Activity.

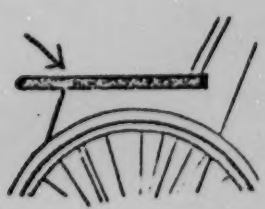
Only if the student knew all the flash cards and had gotten all the Activity matches correct was he/she instructed to go to the teacher and ask for the Check-up for that lesson. The Check-up also contained the same miniaturized pictures as the Activity Sheet, except that the student was now required to make two matches, the word to the picture and the word to the definition. Examples of an Activity and Check-up follow:

Name _____ Date _____

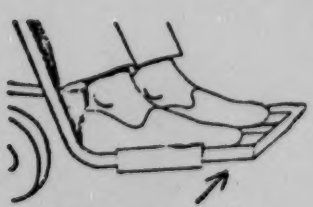
Match the picture and the meaning. Put the right number on the line beside the meaning.

1. wheelchair

2. brake



3. armrest



4. footplate

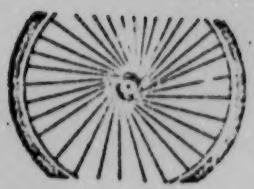
_____ This part of the wheelchair holds up the arms and the upper half of the body.

_____ A flat slat at the bottom of the wheelchair that holds the feet.

_____ A chair that is used to move patients from one place to another.

_____ A part of the wheelchair that stops it from moving.

Name _____ Date _____



5. spokes

6. handrim

7. tipping lever

_____ Metal rim fastened to the wheel. The patient uses this to move and steer the wheelchair.

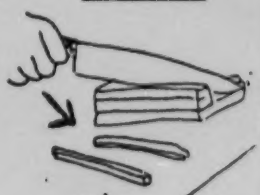
_____ Wires that connect the edge of the wheel to the center of the wheel.

_____ A bar on the wheelchair to help move it over the bumps.

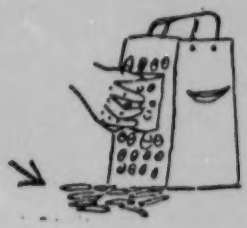
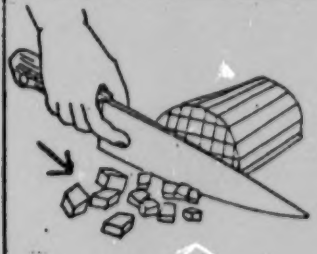
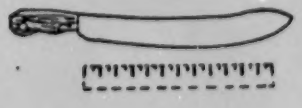
CULINARY ARTS I
Checkup 1
Lesson 1

Name _____ Date _____

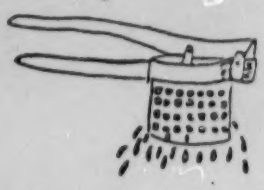
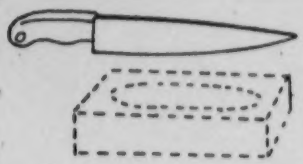
Put the number of the picture next to the word AND next to the meaning. The first one is done for you.

WORD	PICTURE	MEANING
____ boning knife	 1	____ Cucumbers and bread are cut this way.
____ box grater	2	1 Do this to cut carrots or celery into strips that are all the same size.
1 julienne	3	____ This machine cuts and slices food.
____ slice	4	____ Use this to grate cheese.
____ slicing machine	5	____ Use this knife to cut meat from a bone.

Name _____ Date _____

WORD	PICTURE	MEANING
_____ score	 6	_____ Food cut like this looks like playing dice.
_____ butcher's knife	7	_____ You cut this way when you want pieces that are different sizes.
_____ grate	 8	_____ Cut lines into meat so spices sink in.
_____ chop		_____ Do this to rub cheese into pieces.
_____ dice	 9	_____ Cut raw meat like steak with this knife.
	10	

Name _____ Date _____

WORD	PICTURE	MEANING
____ shred	 11	____ Hard food is pressed into soft, thin strings.
____ paring knife	 12	____ You do this when you cut cabbage.
____ rice	13	____ You peel an apple with this knife.
____ mince	14	____ You can slice, chop, mince and dice with this knife.
____ french knife	15	____ You cut food this way when you want very tiny pieces.

The Teacher's Manual was designed for use by a special education teacher who has little or no background in or knowledge of vocational education. In fact, it is very rare to find a person who has expertise in both areas. Consequently, the Teacher's Manual sought to familiarize the resource room teacher with the entry-level positions in the particular trade area. Appendix C of the Teacher's Manual contains a summary of the occupation, outlook for employment, and entry-level requirements from the Occupational Outlook Handbook published by the U.S. Department of Labor, Bureau of Labor Statistics. Appendix C also contains a listing of job activities for each entry-level position.

In addition to an annotated bibliography of references, the Teacher's Manual also contains an introduction to the materials, questions and answers about the use of the materials, teaching suggestions, an alphabetical index of all of the terms in the three booklets, directions for measuring student progress, and answer keys to the Activity pages and Check-ups. An example of a Teacher's Manual is contained in Appendix A of this report.

CHAPTER 3

MATERIALS EVALUATION

The Problem

The purpose of this study was to test the efficacy of using self-instructional packages developed by Project HIRE to teach entry-level technical vocabulary to learning handicapped students who were mainstreamed into five vocational programs. The five trade areas in which materials were developed and studied were (1) Allied Health, (2) Graphic Arts, (3) Arc Welding, (4) Upholstery, and (5) Culinary Arts.

Hypotheses

1. The adjusted, post-test mean Z score of the learning handicapped students receiving entry-level technical vocabulary instruction with the Project HIRE learning packages will be significantly higher than the adjusted, post-test mean of the non-equivalent control group receiving no instruction on the HIRE materials.

2. The learning handicapped students receiving entry-level technical vocabulary instruction with the Project HIRE learning packages will make significant gains in the mean number of words mastered (pre- versus post-test Z scores).

3. The non-equivalent control group of regular vocational students will make no significant gains in the mean number of words mastered (pre- versus post-test Z scores).

4. The majority (75%) of the learning handicapped students will reach criterion on the post-test of words mastered (criterion is 100% correct).

Institutional Settings

The management team of the Project was housed in Boston, Massachusetts, at Boston University, the fourth largest private university in the country. The collaborating vocational/technical schools were all within a radius of approximately thirty-five miles from the university, which is located approximately ten minutes from the downtown Boston shopping district.

All of the collaborating vocational schools were built within the past fifteen years, and are modern, comprehensive regional schools. The socio-economic status of the communities supporting these schools ranges from communities with a large number of economically disadvantaged families to very affluent communities. One might hypothesize that the populations served by the collaborating schools are probably representative of the vocational school population of the state (with the possible exception of "rural" Massachusetts).

Collaborating schools were chosen at the time of proposal writing on the basis of (1) reputation for outstanding programs for learning handicapped students; (2) a history of innovative programming; (3) a willingness to cooperate, and (4) a history of collaboration on similar projects.

The four major collaborating schools were used both as field test sites and/or as participants in the curriculum development. In the case of Blue Hills Regional, the special education personnel were unable to participate due to personnel changes. Thus the planned field testing was not done there. However, the vocational teachers in Blue Hills Graphic Arts Department helped to initiate the

development of the training materials. Figure 1 below shows the various relationships of the major collaborating schools and ancillary field test sites to the Project:

School	Curriculum Development Participation	Field Test Participation	Trade Areas Tested
Major Sites			
Blue Hills Regional Vocational Technical High School	Graphic Arts	No	None
Joseph P. Keefe Technical School	Arc Welding	Yes	All except Upholstery
Minuteman Regional Vocational Technical School	Allied Health	Yes	All except Upholstery
Whittier Regional Vocational Technical High School	Upholstery Culinary Arts	Yes	All
Adjunct Sites			
Lawrence	No	Yes	Upholstery only
Lowell	No	Yes	Upholstery only

Figure 1

Project HIRE Collaborating Schools

Instructional Settings and Test Administration

Each testing school had its own "resource room" and/or center. The rooms were all modern, well-ventilated, and well-lighted. The

resource teachers administered the reading tests and the pre- and post-technical vocabulary tests. Intelligence test scores were those available (latest test score) and were part of the normal school assessment program for students with learning problems. In all cases, only individualized IQ scores were collected. IQ testing is normally done by the school psychologist. The majority of the IQ scores were WAIS scores; some Stanford-Binet scores were included. IQ scores were not available on all the students.

All demographic data and test scores were supplied by the project's collaborating teachers. The teachers were given specific instructions by the project psychologist on how to administer the tests and how to provide appropriate support instruction on the teaching materials. Instructions were also included in a written handout and in the draft of the teacher's manuals (see Appendix A).

Selection of Subjects and Assignment to Treatments

Learning Handicapped Students (Treatment Group)

This group of vocational students was selected on the following bases:

1. Students were enrolled in a regular vocational program (mainstreamed) in one of the five trade areas of the project.
2. Students had been diagnosed as in need of a special education program and had been previously assigned to a Resource Room Program on a regularly scheduled basis.
3. Students were assigned to one of the collaborating resource teachers.
4. Students volunteered. (There were no reported refusals).

The Non-equivalent Control Group (No-Treatment Group)

Students in the comparison group were selected on the following bases:

1. Students were enrolled in the same vocational program as the learning handicapped sample.
2. Students volunteered (no reported refusals). Comparison groups were from two schools only: Whittier and Minuteman.

Table 1 reports the distribution of the total sample by disability type and by treatment group:

Table 1

Distribution of Sample by Disability and Treatment Group

Disability Area	Treatment (N)	Comparison (N)
Learning Disabled	22	0
Educably Mentally Retarded	22	0
Emotionally Disturbed	5	0
Deaf	1	0
Other Handicapped	2	0
No Disability	0	35
TOTALS	52	35

Intelligence test scores were available on 72 of the 85 participants in the sample. The mean IQ for the total group (N=72) was 86.6, s.d. 19.1. For the treatment group, mean IQ was 77.60, s.d.

14.8 (N=41). For the comparison group, average IQ was 98.6, s.d. 17.6 (N=31). The average age of the total population was 211.5 months, s.d. 16 months (17.6 years). The treatment group mean age was 214.1 months, s.d. 17.2 (17 years, 9 months); the comparison group mean age was 207.2 months, s.d. 13.1 months (17 years, 2 months). As expected, the learning handicapped group was significantly older than the comparison group of regular vocational education students (t=1.96, df 82, $p < .05$) and significantly lower on IQ (t=5.49, df 70, $p < .001$). Data on IQ should be interpreted cautiously, since the project did not control IQ testing and IQ tests were administered at different times by different examiners. Data in records are used here to give an approximation of the intelligence level of the sample.

There were 61 males and 26 females in the sample (sex data missing in one case).

Procedures for the Protection of Human Subjects

A parental consent form was developed at the time of proposal writing. This form was approved by the Boston University Research Committee and was supplied to each school. Each collaborating school assumed the responsibility for the selection of volunteers and for obtaining appropriate consent.

Treatment

The treatment consisted of five self-instructional learning packages, containing, for each trade area:

1. Three teaching booklets
2. A set of flash cards
3. An audio tape
4. A teacher's manual
5. Activities and pre-/post-tests.

The learning packages are described in detail in Chapter 2 of this report and samples are contained in Appendix B. The no-treatment group did not receive any special treatment during the experimental period but did receive the normal vocational program alongside the experimental group. All instruction for the treatment group was individualized.

Timing

The experimental period was from January, 1979 through April 31, 1979. Pre-testing was done in the late Fall of 1978 and post-testing on learning packages occurred as each student completed the package.

Experimental Design

The basic experimental design model used in the evaluation of the learning packages was Design 10 from Campbell and Stanley (1966), "The Nonequivalent Control Group Design." It is recommended as

> One of the most widespread experimental designs in educational research . . . (it) should be recognized as well worth using . . . that the addition of even an unmatched or nonequivalent control group reduces

> greatly the equivocality of interpretation over what is obtained . . . (in) . . . the One-Group Pretest-Post-Test Design. (Moreover) . . . for purposes of internal validity, we can regard the design as controlling the main effects of history, maturation, testing and instrumentation. (pp. 47-48)

This basic quasi-experimental design is illustrated in Figure 2, below:

O	X	O	(Treatment Group)
O		O	(Nonequivalent control group)

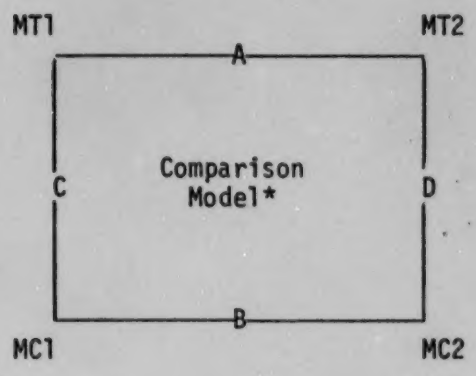
Figure 2

Nonequivalent Control Group Design
of Project HIRE

Pre-Planned Treatment of Data

a. Basic comparisons

The basic pre-planned statistical treatment of the data for comparison of the two groups is a procedure suggested by Guilford (1966). In order to test the major hypotheses, the focus was on comparing gains in the number of words learned pre- versus post-treatment and on the differences between changes (see Guilford, 1966, pp. 194-197). Figure 3, below, illustrates:



Abbreviations

MT1 = Mean of Pre-Test, Treatment Group

MT2 = Mean of Post-Test, Treatment Group

MC1 = Mean of Pre-Test, Control Group

MC2 = Mean of Post-Test, Control Group

Means Compared	Comparisons	Test of Significance
A = MT1 vs MT2	gains?	Correlated t test
B = MC1 vs MC2	gains?	Correlated t test
C = MT1 vs MC1	DIFFERENCES?	Analysis of Covariance, post-test scores as dependent variable; pre-test scores as covariate.
C = MT2 vs MC2		

*Note: Adapted from Guilford, 1966.

Figure 3

Basic Statistical Procedures and Comparisons
Project HIRE Materials Evaluation

b. Equalizing Raw Scores (sigma or z score conversion)

In each of the five trade areas, the total number of words to be learned for criterion varied. The total number of words ranged from 92 in the Graphic Arts set to 324 in the Culinary Arts. Thus, each trade area had a different "total score" and a different distribution.

In addition to being non-equivalent on number of words to be learned, there was no way to ensure that the difficulty level of the entry-level vocabulary words either within a set of three teaching booklets in an individual trade area or among the sets of the five trades were equivalent. It is possible, for instance, that the word list in the Graphic Arts area may have been more difficult than the word list in the Culinary Arts set. (Definitions, however, were all written at the fourth-grade reading level.)

Moreover, since sampling was confined to in situ groups of learning handicapped students, the number of students assigned to any one learning package varied. In the case of Upholstery, the number in the cell was very small (N=5). In other cases, some students were unable to complete an entire set (absenteeism, etc.), thus changing the individual's criterion and making comparisons within trade areas difficult.

For these reasons, it was pre-determined to treat the learning packages in all the trade areas as one treatment for hypothesis testing. Thus, in order to equalize all raw scores, all trade area distributions (raw scores) for both pre- and post-tests were converted to sigma scores (z scores). This procedure is an important and widely used one (Ary, Jacobs & Razavieh, 1972, p. 110), and, according

to Best (1970), this procedure, in

> . . . comparing . . . scores on tests where total point values differ . . . makes possible the equal weighting of the tests (p. 243).

Thus, it avoids the possible creation of a false basis for comparison when raw scores are used (Best, 1970, p. 243).

c. Conversion of Sigma Scores (z) to Z scores

While it is acceptable statistically to use sigma scores as a means of comparing scores on tests of unequal total point values, many researchers and readers find this procedure of using "negative" scores as unnecessarily awkward (Roscoe, 1969). According to Roscoe (1969),

> It is a simple matter to convert z-scores to a new distribution . . . eliminating the negative scores in the process. It is customary to refer to such scores by the capital letter Z . . . a common choice (is one) that yields a score distribution with all positive values, ranging from approximately 20 to 80, while providing for extreme scores ranging from 0-100 . . . (it has) a score distribution with a mean of 50 and a standard deviation of 10. (p. 56)

This common procedure was used in the analyses of the vocabulary test results used in this study. Thus, prior to analysis, all scores were first converted to sigma scores using the formula:

$$z = \frac{X-M}{\sigma} = \frac{x}{\sigma}$$

Next, in order to have all positive scores, these scores were converted to a Z score distribution having a mean of 50 and a standard deviation of 10 by the formula:

$$Z = 50 + 10z$$

Dependent and Independent Variables

The independent variable was whether or not the student received supplemental resource room individualized instruction in the entry-level terminology of the trade which he was studying using the Project HIRE materials.

There were two dependent variables. The major dependent variable was the student's scores on the Project's vocabulary test for the specific area. The second dependent variable was the number of trials to criterion. Since the control group did not use the materials, no comparisons were possible on the second dependent variable.

Instrumentation

Demographic data was collected on each student using a special form prepared for this purpose.

Vocabulary Tests

These tests were especially developed for the learning packages, incorporating the features of the training packages (e.g., illustrations, fourth-grade reading levels in definitions, etc.). Only content and face validity was available on the tests at time of administration. Tests are described in Chapter 2 and samples are on pages 25 - 29.

Intelligence Tests

Test scores were obtained from the records and recorded on the demographic data collection sheet by the resource teachers. The latest individualized test score was obtained. Therefore, data should be interpreted with caution.

RESULTS AND DISCUSSION

Population Data

Table 2 reports the distribution of the sample population by treatment and comparison group and by trade area:

Table 2

Number of Cases and Per Cent of Sample
Treatment vs. Comparison by Trade Area
(N=88)

	TRADE AREAS				
Groups	Allied Health	Arc Welding	Culinary Arts	Upholstery	Graphic Arts
Treatment	N=11 12.5%	N=10 11.4%	N=16 18.2%	N=9 10.2%	N=7 8%
Comparison	N=3 3.4%	N=12 13.6%	N=9 10.2%	N=5 5.7%	N=6 6.8%

School Differences

Comparison groups were available in only two main schools. One-way analysis of covariance using the pre-test Z scores on the technical vocabulary tests as the covariate and the post-test Z scores on the vocabulary tests as the dependent variable found no significant school differences between the two comparison groups (F=3.5, NS). A similar comparison of treatment groups in the three main schools (the two adjunct sites' cells were too small to be included in the analysis) found no significant school differences (F=2.9, NS). Thus, for hypothesis testing, all subsequent analyses treated the schools as one population.

HYPOTHESIS TESTING

Hypothesis 1

> Hypothesis 1: THE ADJUSTED POST-TEST MEAN Z SCORE OF THE LEARNING HANDICAPPED STUDENTS RECEIVING ENTRY-LEVEL TECHNICAL VOCABULARY INSTRUCTION WITH THE PROJECT HIRE LEARNING PACKAGES WILL BE SIGNIFICANTLY HIGHER THAN THE ADJUSTED, POST-TEST MEAN OF THE NON-EQUIVALENT CONTROL GROUP RECEIVING NO INSTRUCTION ON THE HIRE MATERIALS.

The adjusted post-test, Z score mean of the treatment group was 55.14 and for the comparison group the adjusted post-test Z score mean was 42.37. An analysis of covariance, using pre-test Z scores as the covariate and the post-test Z scores of the technical vocabulary tests as the dependent variable, found the treatment groups significantly higher than the comparison group (F=55.8, df 1/86, $p < 001$) on

vocabulary mastery. Thus, Hypothesis 1 was supported. The treatment group scored significantly higher on the mastery tests of technical vocabulary than the non-equivalent control group.

Hypotheses 2 and 3

> Hypothesis 2: THE LEARNING HANDICAPPED STUDENTS RECEIVING ENTRY-LEVEL TECHNICAL VOCABULARY INSTRUCTION WITH THE PROJECT HIRE LEARNING PACKAGES WILL MAKE SIGNIFICANT GAINS IN THE MEAN NUMBER OF WORDS MASTERED (PRE- VERSUS POST-TEST Z SCORES).
>
> Hypothesis 3: THE NON-EQUIVALENT CONTROL GROUP OF REGULAR VOCATIONAL STUDENTS WILL MAKE NO SIGNIFICANT GAINS IN THE MEAN NUMBER OF WORDS MASTERED (PRE- VERSUS POST-TEST Z SCORES).

The pre-test Z score mean of the treatment group was 46.9, s.d. 9.1. The post-test Z score mean of the treatment group was 53.3, s.d. 8.7, representing a gain of 6.4. A correlated t test found this gain to be significant ($t = 5.97$, df 51, $p < 001$). Thus, Hypothesis 2 was supported.

The pre-test Z score mean of the comparison group was 54.6, s.d. 8.9. The post-test Z score mean of the comparison group was 45.1, s.d. 9.3, representing a significant loss of 9.4. A correlated t test found that the comparison group did not have significant increase in the number of words mastered; in point of fact, the group significantly scored lower on the post-test than on the pre-test ($t = 6.62$, df 34, $p < 001$). Thus, Hypothesis 3 was supported.

Hypothesis 4

> Hypothesis 4: THE MAJORITY OF THE LEARNING HANDICAPPED STUDENTS (75%) WILL REACH THE CRITERION OF 100% OF THE WORDS CORRECT ON THE POST-TEST VOCABULARY TESTS.

Only 65% of the learning handicapped students (treatment group) reached the criterion of 100% mastery on the post-test. Therefore, Hypothesis 4 was not supported. However, since a 65% majority of the treatment group did reach criterion, and since the trend was only 10% below the 75% majority pre-planned as the level of hypothesis acceptance, further analyses of the data seemed warranted.

Significantly, as one would expect from the results of the testing of Hypotheses 1-3, no member of the comparison group reached the 100% mastery criterion.

Table 3 reports the per cent of the treatment sample achieving 100% and 75% correct by trade area:

Table 3

Number of subjects, per cent reaching criterion of 100% correct, per cent reaching 75% correct, per cent diagnosed as EMR, number of correct responses for reaching 100% criterion by trade area

Trade Area	N	Per cent 100% Correct	Per cent 75% Correct	Per Cent Diagnosed EMR	Number of Correct Responses for Criterion of 100%
Graphic Arts	7	100%	100%	0	92
Upholstery	9	100%	100%	33%	238
Culinary Arts	15	27%	53%	53%	324
Arc Welding	10	90%	100%	20%	272
Allied Health	11	45%	91%	82%	244
All Areas Combined	52	65%	85%	42%	N/A

Note that when Hypothesis 4 is tested by each trade area individually, the hypothesis of a 75% majority obtaining 100% mastery is supported for three of the five trade areas! If the criteria is changed post hoc to 75% mastery, it is achieved in four of the five trade areas.

A further inspection of the data suggests that the problem may be related to the learning rates of the various disability sub-groups. For example, over half of the students in the Culinary Arts treatment (53%) were EMRs, and 82% of the sample in the Allied Health treatment were EMRs. These two areas ranked lowest on per cent of sample achieving mastery. On the other hand, there were no EMRs in the Graphic Arts sample, and only three in the Upholstery sample, both trade areas ranking highest percentage-wise of those achieving 100% mastery. Moreover, only 41% of the total EMR sample reached criterion, while 82% of the learning disabled, 80% of the emotionally disturbed, and 100% of the other disabled categories reached the criterion of 100% mastery.

It should also be noted that, due to time constraints in individual teacher/student programs, it was not possible to extend the number of trials, in most cases, beyond 4. The mean number of trials to final score ranged from 1.4 to 1.8 trials per lesson. Table 4 reports the mean number of trials to final score for the treatment group by lesson. The range is also reported. With two cases as exceptions, the range was from 1 to 4 trials per lesson.

Table 4

Means, Standard Deviations, and Ranges of Trials to Final Score of Treatment Group by Lesson*

Lesson Number	Mean, S.D. Trials	Range	Lesson Number	Mean, S.D. Trials	Range
1	1.4, .66	3	9	1.8, .80	3
2	1.5, 1.1	3(8*)	10	1.8, .99	4
3	1.5, .7	3	11	1.4, .73	4
4	1.5, .82	4	12	1.6, .80	4
5	1.8, 1.2	4(6*)	13	1.5, .74	4
6	1.8, .86	4	14	1.5, .60	2
7	1.7, .71	3	15	1.7, .83	2
8	1.6, .76	4			

*See discussion below.

Because of the variability in the number of responses for 100% mastery by each trade area, because of the relatively small number of subjects in each trade area, and because of the variability in the number of lessons per trade area (not all trade areas had 15 lessons), no attempt was made to further analyze trials to final score by trade area. The mean trials to final score in Table 4 above are based on summing all trials for each lesson of all of the learning packages. This data should be viewed from the perspective that it suggests that, regardless of trade area and regardless of the level of difficulty of the words by trade area, the range of trials to final score per lesson was relatively small: 1-4, with an average of 1.4 to 1.8

trials. It is possible, therefore, that if more trials had been planned for, the entire sample might have reached the criterion of 100% correct.

Also, please note that for Lessons 2 and 5, the actual range was 8 and 6 respectively. This number of trials to final score represents, however, only two individuals. When these two cases are removed, the range for these two lessons is consistent with all the others. In the case of the subject in Lesson 2 who took 8 trials, it is interesting to note that he did reach 100% criterion in 8 trials, that he was labeled "deaf," and that, with the exception of Lesson 2, he averaged 2.3 trials to final score (s.d. .89, range 1-4) for all other lessons. The second subject was labeled EMR, had a Full Scale IQ of 76, did not reach the 100% criterion, but had a range of 1-4 trials ($\bar{X}$ = 2.9 trials, s.d. 1.0) to final score for all other lessons. While he did not reach 100% mastery, he did master, within the specified number of trials, an additional 53 new technical words, from pre- to post-test.

An examination of the trials to final score and the differences in the percentage of treatment subjects reaching 100% mastery by trade area and by disability suggested that further analysis of the standard Z scores on these classification variables might yield additional information.

Differences by Trade Area

Table 5 on the next page reports the post-test and adjusted Z means of the treatment and comparison groups by trade areas.

Table 5

Post-Test and Adjusted Post-Test Means of Treatment and Comparison Groups on Standard Z Scores of the Technical Vocabulary Tests by Trade Areas

	TREATMENT			COMPARISON		
Trade Area	N	Post-Test Mean	Adjusted Mean	N	Post-Test Mean	Adjusted Mean
Allied Health	11	50.75	50.03	3	47.27	45.64
Arc Welding	10	58.33	56.07	12	43.06	46.46
Culinary Arts	15	47.52	48.13	9	54.13	52.69
Upholstery	9	56.56	57.29	5	38.19	36.18
Graphic Arts	7	58.32	62.43	6	40.29	38.34

A one-way analysis of covariance, using the pre-test Z scores as the covariate and the post-test Z scores as the dependent variable, found significant differences among the Trade Areas Treatment groups on vocabulary progress ($F = 9.90$, df 4/51, $p < 001$). Subsequent Sheffé analyses found:

1. The Culinary Arts group was significantly lower in progress made on vocabulary mastery than:

   (a) the Arc Welding group ($F = 13.66$, $p < 05$)
   (b) the Upholstery group ($F = 17.05$, $p < 01$)
   (c) the Graphic Arts group ($F = 35.26$, $p < 01$).

2. The Allied Health group made significantly less progress on vocabulary mastery than the Graphic Arts Group ($F = 23.76$, $p < 01$).

3. No other significant differences were found.

A one-way analysis of covariance, using the pre-test Z scores as the covariate and the post-test Z scores as the dependent variable, found significant differences among the Trade Areas Comparison groups on vocabulary progress ($F = 11.01$, df 4/34, $p < 001$). Subsequent Sheffé analyses found:

1. The Upholstery group was significantly lower in progress made on vocabulary mastery than:

   (a) the Arc Welding group ($F = 13.71$, $p < 05$)
   (b) the Culinary Arts group ($F = 32.20$, $p < 01$).

2. The Graphic Arts group made significantly less progress on vocabulary mastery than the Culinary Arts group ($F = 27.24$, $p < 01$).

3. No other significant differences were found.

The findings of differences between the vocabulary progress made in the Treatment groups are consistent with the previous findings of the percentage of subjects achieving mastery in each of the groups. It would be expected from the percentage achieving 100% mastery (or 75% mastery) as reported in Table 3 on page 46, that the Culinary Arts group would score significantly lower than Arc Welding, Upholstery, and Graphic Arts groups. The finding that the Allied Health group scored lower than Graphic Arts is also consistent with the data reported in Table 3).

In contrast to the data on the treatment groups, the findings concerning the differences among the comparison groups are not easily explicable. These data should be interpreted with caution since there were very small N's in the cells of the Upholstery and Allied Health groups. Moreover, comparison subjects were available in only two schools, and for individual trade areas there may be differences in

programs, teachers, etc., which may not be "averaged" out as they would be with a larger sample (e.g., more than N=3 in Allied Health). At this point, with these data, one can only speculate. For instance, it is interesting to note that the comparison groups of regular students in the Graphic Arts and Upholstery group scored lower than most of the other groups. This is in stark contrast to the findings of the Treatment groups, where learning handicapped students (after treatment) achieved 100% mastery in these same two trade areas. One could speculate, from this fact, that the level of difficulty of the trade area vocabulary or the ability level of the students is probably not as important to vocabulary mastery as the teaching methodology. However, one cannot test this hypothesis with these data. Further investigation seems warranted.

Differences by Disability

Since the inspection of the data on percent of subjects achieving the criterion of 100% vocabulary mastery found that EMR subjects were less likely to achieve mastery than the LDs, it seemed appropriate to look closer at the differences among the major groups on final Z scores. The three largest groups, for purposes of this analysis, were included in the COVAR, the Learning Disability group (N=22), the Educable Mentally Retarded group (N=22), and the regular vocational students (N=35). The smaller subgroups were omitted to avoid the problems associated with small "cells."

A one-way analysis of covariance, using the pre-test Z scores as the covariate and the post-test Z scores as the dependent variable,

found significant differences among the three groups on vocabulary progress. Subsequent Sheffé analyses found the Regular vocational students (adjusted post-test Z $\overline{X}$ = 42.67) significantly lower than the adjusted post-test Z mean of the EMR group ($\overline{X}$ = 52.77) and the adjusted post-test Z mean of the learning disabled group ($\overline{X}$ = 57.00) as expected (Sheffé F's =, respectively, 29.61, 59.6, $p < 001$).

More importantly, Sheffé analyses found no significant differences between the EMRs and the LDs on adjusted vocabulary Z mean scores. What this means is that apparently the LDs did not make as much progress in the treatment "on the average," but both groups scored significantly higher (made more progress) than the regular vocational students who were not given additional instruction. This suggests that special instruction is important to mastery of the entry-level technical vocabulary. It may be that all treatment groups could have achieved mastery at the same level had the number of trials been extended. Further investigation of the trial effects seems warranted.

IQ Differences, Treatment by Trade Area

IQ scores were not available on the entire sample and, as mentioned earlier, these data were obtained from existing records. Therefore, one should be cautious about making inferences from these findings. Analysis of variance found a significant F by trade area for the treatment group (on those for whom scores were available) for IQ ($F = 5.063$, df 4/36, $p < 002$). Subsequent Sheffé analyses found that the Allied Health group was significantly lower on IQ than the Arc Welding group and the Graphic Arts group. No other significant

differences on IQ were found. This finding is not surprising, since the Allied Health group was primarily composed of EMRs (82%). It should be noted that, while Allied Health had the largest proportion of EMRs of the five treatment groups, it ranked fourth on the percentage of those achieving the 100% mastery criterion. Moreover, when a criterion of 75% correct is used, over 91% of the Allied Health sample achieved this criterion.

Student Responses

Using procedures established in a similar project (Gardner & Kurtz, 1979), the learning handicapped students were asked to circle as many adjectives or adjective phrases as they desired to describe the HIRE instructional materials from the list below:

a.	fun	work not fun
b.	boring	interesting
c.	easy	hard
d.	useless	helpful

Forty-six of the fifty-two learning handicapped students completed this exercise. For purposes of analysis, all the negative loadings were summed in one cell (45 negative responses), and all the positive in a second cell (120 positive responses). Significantly more positive adjectives were checked than negative ones (chi square = 34.08, $p < .001$). Eighteen of the students checked only positive adjectives. Consistent with the Gardner & Kurtz (1979) study, the most frequently checked adjectives were "fun," "interesting," and "easy."

CONCLUSIONS AND RECOMMENDATIONS

From the hypothesis testing, one can conclude that the Project HIRE materials were exceptionally effective in helping the learning handicapped students in this sample either achieve mastery or make significant progress towards mastery of the entry-level vocabulary for their trade areas. These findings are consistent with previous work by Gardner & Kurtz (1977, 1979). It is apparent, then, that these materials are an effective and economic way to teach the vocabulary so necessary for entry-level job success to learning handicapped students. It is also apparent that the Project HIRE approach should be developed in other trade areas. It is further obvious, both from the "hard data" contained in this study and from conversations with vocational teachers, that these materials would benefit regular students who may be having difficulty mastering the terminology.

We have had excellent response to the HIRE materials as we have demonstrated them at numerous workshops and conventions over the past year and a half (see Chapter 4). The response from professionals and administrators in special education and vocational education has been almost overwhelming.

THE FOLLOWING PROGRAMMATIC RECOMMENDATIONS ARE PROFERRED:

1. IT IS STRONGLY RECOMMENDED THAT THE PROJECT HIRE MATERIALS BE FURTHER REFINED, PROFESSIONALLY PUBLISHED, AND DISSEMINATED NATIONALLY.

2. IT IS STRONGLY RECOMMENDED THAT ADDITIONAL FUNDS BE ALLOCATED FOR THE DEVELOPMENT OF SIMILAR MATERIALS IN OTHER TRADE AREAS WHERE LEARNING HANDICAPPED STUDENTS CAN BE APPROPRIATELY PLACED.

3. IT IS RECOMMENDED THAT CONSIDERATION BE GIVEN TO USING (AFTER FIELD TESTING) THESE MATERIALS OR SIMILAR MATERIALS TO ASSIST SELECTED DISADVANTAGED AND REGULAR VOCATIONAL STUDENTS WHO HAVE NOT MASTERED THE ENTRY-LEVEL VOCABULARY TO DO SO QUICKLY AND EFFECTIVELY.

Since Project HIRE was a curriculum development project and not a research project, no attempt was made to isolate the components which may have contributed to the learning progress of the treatment group. The learning principles used were not tested individually and no conclusions can be drawn about the benefits of the illustration approach versus no illustration versus use of an audio tape versus flash cards, etc. Moreover, no attempt was made to determine the efficacy of using these materials with other populations (such as a bilingual population), and it was impossible to test for the effects of trials on various disability groups.

THEREFORE THE FOLLOWING RESEARCH RECOMMENDATIONS ARE MADE:

4. IT IS RECOMMENDED THAT THE MATERIALS BE TESTED ON OTHER POPULATIONS SUCH AS SLOW LEARNERS, DISADVANTAGED STUDENTS, AND REGULAR STUDENTS HAVING DIFFICULTY.

5. IT IS FURTHER RECOMMENDED THAT A STUDY BE DEVELOPED TO TEST THE EFFECTS OF THE NUMBER OF TRIALS TO MASTERY ON THE VARIOUS DISABILITY GROUPS.

6. IT IS RECOMMENDED THAT A STUDY BE DEVELOPED TO TEST THE RELATIVE EFFECTS OF THE VARIOUS COMPONENTS OF THE HIRE LEARNING PACKAGES ON VOCABULARY MASTERY.

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CHAPTER 4

OTHER PROJECT ACTIVITIES

The three major objectives of the grant centered around the development, refinement, and field-testing of curriculum materials. These objectives are discussed in great detail in Practical Approaches to Curriculum Development: A Management Handbook, which is Volume II of the final report for Project HIRE, and also in Chapters 2 and 3 of this Volume.

A fourth objective was concerned with dissemination of the procedures developed by the management team for interdisciplinary curriculum development of vocational materials for learning handicapped students and dissemination of the materials produced by the Project. This objective was met above and beyond the original proposal stipulations through a variety of publications and presentations/conferences.

I. Publications

A brochure describing the goals of Project HIRE was designed and printed during the first year of the grant. Of the 2,500 copies of the brochure, 1,500 were mailed to professionals across the country whose names were included on the mailing lists developed by the Department of Business and Career Education at Boston University School of Education and by Project VITA, the project on which the HIRE materials are based. A letter was sent to those people who requested

information and their names were added to the mailing list if necessary. Of the remaining 1,000 brochures, approximately 750 were given to teachers and administrators during various presentations and conferences. A copy of the three-fold brochure is enclosed.

In addition to the brochure, four articles describing the Project were published:

1. "Technical terms and special needs," School Shop, May 1978. This particular article was addressed to vocational educators and administrators who are faced with mainstreaming learning handicapped students. The article discussed the need for supplementary materials for technical vocabulary development, gave a description of the materials, and the procedures used to determine entry-level status of the terms used in the modules, as well as a contact source for anyone wishing additional information.

2. "Motivating teachers for vocational curriculum development for the handicapped," Education, 1980, in press. This article discussed some of the research conducted by the Project management on identification of innovative teachers and the reasons why they participate in vocational curriculum development for the handicapped.

3. "Vocational curriculum development for the handicapped: What motivates teachers to participate?", Resources in Education (ERIC), in press. This article described the development and subsequent reliability and validity statistics of the instruments used to determine "change orientation" of teachers and preferred incentives to participate in vocational curriculum development for the handicapped.

Project HIRE
Project HIRE is an acronym for *H*andicapped *I*nstructional *R*esources *E*nrichment.
The Department of Business and Career Education, Boston University School of Education, supported by U.S.O.E. Grant #498AH70309, directs Project HIRE.

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This research is supported by a grant from the U.S. Office of Education, Department of Health, Education, and Welfare. The opinions expressed herein do not necessarily reflect the position or policy of the U.S. Office of Education, and no official endorsement by the U.S. Office of Education should be inferred.

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Project Hire

School of Education
Department of Business
and Career Education

A Curriculum Management System for Instructing the Handicapped

Project Hire

Project HIRE is an acronym for *H*andicapped *I*nstructional *R*esources *E*nrichment.

Project Description

Project HIRE is a federally funded project for developing vocational curriculum modules for use in resource-rooms as supplemental teaching materials. These materials will support the ongoing vocational instruction of handicapped students with mild learning problems who are enrolled in regular vocational programs.

Concurrent Project Objectives

Project HIRE has two separate major objectives. Work on both of these objectives is being carried out simultaneously by the Project HIRE staff. These objectives are:

1. To design, develop, and test new standards for the development of curriculum and instructional materials for use by handicapped students enrolled in regular vocational programs, and to design, develop, and test the strategies for meeting those standards.

2. To design, develop, field-test, and refine curriculum materials for use in the resource-room to support the vocational instruction of handicapped students enrolled in regular vocational programs.

Procedures

The University staff is responsible for the overall management of the project. This staff works with interdisciplinary teams from four cooperating vocational-technical schools in the curriculum development phase of the project. These school-based teams consist of the Administrator of Special Education, special education teachers, and vocational teachers. Each cooperating school is responsible for the development of at least three curriculum modules in a specific vocational area.

Products

1. The Major curriculum products of the project will consist of three curriculum modules of technical vocabulary for each of these five specialized vocational areas:

GRAPHIC ARTS
ARC WELDING
ALLIED HEALTH
CULINARY ARTS
UPHOLSTERY

The Modules will be field-tested and refined before final production. Supplementary teaching aids and a teacher's handbook will accompany each set of three modules.

2. *Standards and Strategies Report*

A brochure will be published describing the curriculum management standards and strategies system developed and tested by Project HIRE.

3. *Final Report*

A report on the processes, developed materials and project evaluation will be published.

Dissemination

Dissemination of the Project HIRE products will be conducted through the working papers system of the Department of Business and Career Education. As a part of the dissemination process, three separate conferences will be held. One conference will be open to special education teachers and administrators. A second conference will be open for vocational teachers and administrators, and a third will be open to other interested professionals.

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Participating Schools

Blue Hills Regional Vocational Technical High School, Canton, Massachusetts
Joseph P. Keefe Technical School, Framingham, Massachusetts
Minuteman Regional Vocational Technical School, Lexington, Massachusetts
Whittier Regional Vocational Technical High School, Haverhill, Massachusetts

Other Field-Testing Sites

Greater Lawrence Regional Vocational Technical High School, Andover, Massachusetts
Greater Lowell Regional Vocational Technical School, Tyngsboro, Massachusetts

4. "The future of career/vocational education for exceptional individuals: Breaking down the barriers to employment of the handicapped," Proceedings of the Conference on Special Education in the '80s and Beyond, Florida Atlantic University, Boca Raton, Florida, June, 1979. This article discussed some of the issues which must be addressed by practitioners in the field if major improvements and growth in career/vocational education of handicapped persons are to be realized in the coming decade.

II. Presentations and Conferences

Although the original grant proposal called for only three conferences, the Project management made well over a dozen professional presentations, in addition to numerous presentations to graduate and undergraduate classes in Special Education and Career Education at Boston University. A summary of major presentations follows:

National Presentations

1. "Models for interdisciplinary development of resource room materials for learning disabled and mildly mentally retarded students in vocational programs." Presented at the 57th International Convention of the Council for Exceptional Children, Kansas City, Missouri, April, 1978. D. C. Gardner and G. J. Beatty.

2. "Vocational curriculum development for the handicapped: What motivates teachers to participate?" Paper presented at the Annual Meeting of the Eastern Educational Research Association, Kiawah

Island, South Carolina, February, 1979. D. C. Gardner and G. J. Beatty.

3. "Crackerbarrel session leader: Curriculum materials in vocational education for the handicapped." Presented at the CEC National Topical Conference on Career Education for the Handicapped, St. Louis, Missouri, February, 1979. D. C. Gardner.

4. "Adapting HIRE materials in vocational education of the handicapped." Presented at NETWORK, Andover, Massachusetts, April, 1979. D. G. Gardner and G. J. Beatty.

5. "A symposium on removing barriers to technical careers: A curriculum management program for retarded adolescents." Paper presented at the 103rd Annual Meeting of the American Association on Mental Deficiency, Miami, Florida, May, 1979. D. C. Gardner and G. J. Beatty.

State and Regional Presentations

In addition to the national presentations, Project HIRE management personnel made a special effort to bring the materials to practitioners in the field. The original proposal called for conferences at Boston University. Since several professional presentations were made in Massachusetts and numerous presentations were made in classes at Boston University, it was felt that a wider dissemination could be achieved and a greater number of practitioners reached if the materials were brought to interested professionals in the rest of New England. Through the cooperation of an associate, it was also possible to arrange presentations in two of Florida's largest counties while

the principal investigator and the project manager were in Florida for the presentation at AAMD.

The following are the state and regional presentations:

Presentations in Massachusetts

6. "The implications of social learning theory for the acquisition of technical vocabulary by learning handicapped students." Presented at the Regional Meeting of CEC, Framingham, Massachusetts, November, 1978. D. C. Gardner.

7. "Career development assessment techniques for handicapped persons." Presented at the 33rd Annual New England Personnel and Guidance Conference, September, 1979. D. C. Gardner and G. J. Beatty.

8. "Individualizing the curriculum for learning handicapped students." A workshop for an Inservice Training Program in New Bedford, MA, March, 1979. G. J. Beatty.

Presentations in New Hampshire

9. Demonstration of HIRE materials to New Hampshire Department of Education, Mr. John Bean, Specialist for Special Education, March, 1979. D. C. Gardner and G. J. Beatty.

10. Presentation at the Annual Meeting of the State Directors of Vocational Education of New Hampshire, August, 1979. D. C. Gardner and G. J. Beatty.

11. Presentation at Portsmouth High School, Portsmouth, New Hampshire, during an Inservice Seminar, April, 1979. G. J. Beatty.

12. "A visual image approach to teaching entry-level job terminology to learning handicapped students." A presentation at the 26th

Annual Conference of AAMD, Northeast Region X, October, 1979. D. C. Gardner and G. J. Beatty.

Presentations in Maine

13. Demonstration of HIRE materials to Maine Department of Education, Mr. Carl Butler, Specialist in Vocational Education, March, 1979. D. C. Gardner and G. J. Beatty.

14. Presentation at the Annual Meeting of the State Directors of Vocational Education of Maine, October, 1979. D. C. Gardner and G. J. Beatty.

15. Presentation at Lewiston High School, Lewiston, Maine, to vocational teachers, June, 1979. D. C. Gardner and G. J. Cowan.

Presentations in Vermont

16. Demonstration of HIRE materials to Vermont State Department of Education, Mr. Carl Wimmer, Specialist in Vocational and Special Education, March, 1979. D. C. Gardner and G. J. Beatty.

Presentations in Florida

17. "Breaking down barriers to employment of the handicapped." Presentation at the Topical Conference on Special Education in the '80s and Beyond held at Florida Atlantic University, Boca Raton, Florida, June, 1979. G. J. Beatty.

18. Demonstration of HIRE materials to Broward County Director of Special Education, Ann McMichaels, May, 1979. D. C. Gardner and G. J. Beatty.

19. Demonstration of HIRE materials to Palm Beach County Director of Special Education, Donna Batelaan, May, 1979. D. C. Gardner and G. J. Beatty.

At many of the presentations, a slide-tape of Project HIRE was used. The script is included in this chapter. Also included are some sample letters received by the Project Director as a result of the presentations.

Project HIRE

Slide-Tape Script

SLIDE	SCRIPT
1. Blank slide	The Special Education/Career Education program at Boston University's School of Education is concerned with training teachers to help handicapped students make the transition from school to work.
2. Boston University School of Ed. Blg.	
3. Students working in upholstery shop	Recent federal legislation has emphasized the mainstreaming of learning handicapped students into regular vocational programs.
4. teachers working with students in resource room	This fact has underscored the lack of special curriculum materials for use in resource rooms to support the on-going vocational program.
5. students working in Cul. Arts kitchen	Faculty research has shown that most learning handicapped students are capable of mastering the vocational skills for
6. students in welding	entry-level employment in a variety of occupational areas.
7. collage of technical terms	However, many learning handicapped students experience frustration when they attempt to learn the technical language or read the textbooks of these occupations.
8. difficult text	Therefore, the need for materials is especially important in this area.
9. VITA lettering	Project VITA, an acronym for Vocational Instruction, Training, and Assessment, was the first of two projects funded by the United States Office of Education at Boston University School of Education.
10. VITA materials	This project designed graphic arts vocational curriculum modules to be used by resource room teachers in vocational schools.

SLIDE	SCRIPT
11. occupational outlook graph	A study by the Eastman Kodak Company predicted high employment opportunities in the field of Graphic Arts for the coming decade.
12. colored bar graph showing employment of handicapped persons	This study also showed that more than half of the companies responding to the survey employed members of special groups, including physically or learning handicapped persons.
13. VITA slide #34 (materials)	For these reasons, Project VITA concentrated on curriculum materials in the Graphic Arts area with particular emphasis on phototypesetting.
14. VITA slide #45 (tests)	It also developed an assessment procedures manual which reviews appropriate vocational interest and aptitude tests for learning handicapped students.
15. HIRE lettering	From the pioneering work of Project VITA emerged Project HIRE, "A Curriculum Management System for Instructing the Handicapped."
16. all materials arranged on table	Project HIRE has developed and field-tested individualized instructional packages in five trade areas: Culinary Arts, Allied Health, Arc Welding, Upholstery, and Graphic Arts.
17. VITA slide #60 (group of teachers at table)	The list of technical terms was developed in cooperation with an interdisciplinary team of special and vocational educators from four regional vocational high schools in Massachusetts:

18. Blue Hills Voc. Tech.	Blue Hills in Canton;
19. Keefe Voc. Tech.	Keefe in Framingham;
20. Minuteman Voc. Tech.	Minuteman in Lexington;
21. Whittier Voc. Tech.	and Whittier in Haverhill.
22. 3 HIRE modules 1 book open to list of words	An employer-validated list of technical terms is incorporated into three self-instructional booklets for each of the five trade areas. There are ten to fifteen words in each lesson and about 150 words to each set. Definitions have been rewritten at a fourth-grade reading level.
23. flashcards and tapes	A set of flash cards and an audiotape accompanies each teaching booklet.
24. activities and checkups	There is also a set of activities for the student to use to check his/her own progress at the end of each lesson as well as a final test of mastery.
25. closeup of one page of modules	An added feature of the training booklets is that each definition is illustrated with a line drawing representing the concept or the tool being defined.
26. Teacher's manuals One open to question and answer page	The Teacher's Manual prepared for each area includes directions for use of the materials, answer keys to exercises, and a supplementary bibliography of additional references.
27. slide of entry-level job page in Teacher's Manual	Also included is entry-level occupational information with lists of duties required for acceptance into entry-level jobs, and general information about Project HIRE.

SLIDE	
28. student at work in resource room	The combination of easy-to-understand definitions and simple line drawings has helped make the learning of new terms a faster and easier process for students who might be faced with reading and interpreting the following definition of "tensile strength," an important entry-level term for Arc Welding.
29. definition of tensile strength from dictionary	"The resistance of a material to forces of rupture and longitudinal stress, usually expressed in pounds or tons per square inch."
30. HIRE definition of tensile strength	The Project HIRE version of this definition, after many revisions and validations, now reads at about the fourth-grade reading level: "Tensile strength is the amount of pressure a weld can take before it breaks. The tensile strength is shown in the first two numbers of the electrode code."
31. closeup of picture of tensile strength	Moreover, line drawings accompany each definition of a technical term. This feature is designed to help simplify the learning process for many students who may have difficulty with verbal cues.
32. teachers from Project HIRE working with Assoc. Director	The simplicity of the materials and the self-programmed approach were considered to be important aspects for resource room teachers.

33. Dick Lee, Minuteman	The special education teachers, for instance, felt that
34. Janis Broskie, Minuteman	INSERT QUOTES - Dick Lee, Jan Broski
35. group of voc. teachers	The cooperating vocational teachers were equally enthusiastic. An upholstery teacher pointed out
36. Bill Lueders, Whittier	INSERT QUOTE - Bill Leuders
37. resource room	The development of curriculum materials for use in resource rooms was only one focus of the project.
38. teachers sitting around table	Project HIRE was also concerned with developing a management system for inter-disciplinary curriculum development. A description of the management approach of the project appears in the Final Report to the USOE.
39. Dr. Gardner, Director of Project HIRE	The Boston University Management team consisted of Dr. David C. Gardner, Principle Investigator and Project Director;
40. Dr. Beatty, Assoc. Dir.	Dr. Grace Joely Beatty, Associate Director and Project Manager;
Dr. Warren, Psychologist	and Dr. Sue Allen Warren, Project Psychologist.
42. slide of address	Detailed information on the field testing of the materials can be obtained by writing: Project HIRE Boston University School of Education 765 Commonwealth Avenue Boston, MA 02215 (END OF AUDIO)

43.
BU nondiscrimination
statement slide

44.

USOE disclaimer statement
slide

45.

Produced by
Mary L. Higgins,
Senior Research Assistant
slide

Samples of Letters
Responding to Presentations
on Project HIRE

FLORIDA ATLANTIC UNIVERSITY
BOCA RATON, FLORIDA 33431
(305) 395-5100

COLLEGE OF EDUCATION
PERSONNEL SERVICES - EXCEPTIONAL STUDENT EDUCATION
EXCEPTIONAL CHILD RESEARCH, DEMONSTRATION
AND TRAINING CENTER

June 4, 1979

Dr. David C. Gardner
Chairman
Department of Business and
Career Education
Boston University
765 Commonwealth Avenue
Boston, MA 02215

Dear Dr. Gardner:

May I take this opportunity to thank you and Doctor Cowan for spending the time with us on the Project HIRE materials. The site visits that you generously made with me to the two largest school districts in our service area undoubtedly will impact a large number of handicapped students in Florida.

As you know, the Palm Beach and Broward counties school districts are among the largest and most innovative in our state. The feedback that I have received from my faculty and from both Ann McMichaels of Broward Public Schools and Donna Batelaan of the Palm Beach Schools has been most gratifying. We sincerely hope that you will keep us apprised of your progress in the further development and dissemination of these materials.

Again, thank you for providing us with the opportunity to see these exciting materials firsthand. We look forward to their adoption in Florida.

Sincerely,

Dr. Jeffrey Schilit
Chairperson
Exceptional Student Education

cc Dr. Grace Joely Cowan

STATE OF MAINE

Department of

Educational and Cultural Services

AUGUSTA, MAINE 04333

May 3, 1979

Dr. David C. Gardner, Director
Mrs. G. Joely Cowan, Associate Director
Project H.I.R.E.
c/o Boston University
School of Education
765 Commonwealth Avenue
Boston, MA 02215

Dear David and Joely:

On behalf of the visiting team from Maine, I would like to thank you for your efforts in scheduling the trip to Whittier on April 26, 1979, and in coordinating with Pat Lavin our excellent tour and program visitations.

This was a most worthwhile experience for us and helped to reinforce our thinking about the need to share this kind of educational process and materials with Maine's Vocational Directors and Special Education Coordinators.

You will undoubtedly be hearing from Dr. Berry at the University of Southern Maine at Gorham regarding the scheduling of a meeting in Maine later on in the summer.

I will look forward to seeing you both in the near future.

Thanks again for your help in making us aware of Project H.I.R.E.

Sincerely,

Mrs. Jean W. Jones, Consultant
Wage-Earning Programs
Bureau of Vocational Education

JWJ/jeb
cc: Dr. Arthur Berry, U.S.M.
Mr. Carl Helms, U.S.M.
Mr. Ken Jordan, Director, Lewiston Voc. Ctr.
Mr. Carl Butler, Director, Program Services, B.V.E.
Mr. Tom Birmingham, B.V.E.

Four seasons for Me.

UNIVERSITY OF SOUTHERN MAINE
A UNIT OF THE UNIVERSITY OF MAINE

Industrial Education and Technology

37 College Avenue
Gorham, Maine 04038

October 30, 1979

Dr. David Gardner
Dr. Grace Joely Cowan
Boston University
Division of Special & Counselor Education
765 Commonwealth Avenue
Boston, MA 02215

Dear Dave & Joely:

Just a note to express our appreciation for your excellent presentation of Project HIRE at the meeting of the Maine Directors of Vocational Education in Waterville on October 24, 1979.

The Directors were much impressed with the thoroughness and the applicability of the project and look forward to the eventual publication of the materials. Many nice words were said about your lively and interesting presentation.

My personal thanks for your fine cooperation. Hope to have you back in Maine in the future.

Sincerely,

John S. Greer
Staff Development Consultant

JSG:sk

UNIVERSITY OF SOUTHERN MAINE
A UNIT OF THE UNIVERSITY OF MAINE

Industrial Education and Technology

37 College Avenue
Gorham, Maine 04038

May 8, 1979

Dr. David C. Gardner, Chairman
Department of Business and Career Education
School of Education
Boston University
765 Commonwealth Avenue
Boston, MA 02215

Dear Dr. Gardner:

I enjoyed our meeting at Whittier Regional Vocational-Technical High School on April 26, 1979. Thank you for your follow-up letter of April 30, 1979, in regards to Northeastern's life planning materials.

At Whittier you mentioned that there were some materials, similiar to Project HIRE, to assist college students with statistics vocabulary. Will you please inform me how I can learn about this.

For your information I am enclosing a copy of Making A Life ... Making A Living, which was developed for the use of teachers in Maine.

Sincerely,

Carl H. Helms
Staff Development Consultant

CHH/ddb

Enclosure

LEWISTON HIGH SCHOOL

156 East Avenue
Lewiston, Maine 04240
Tel-784-2371

CHARLES A. BLEAKNEY, JR.
Principal

JOHN G. BOUCHLES
Asst. Principal

RICHARD GIBSON
Asst. Principal

KENNETH JORDAN
Vocational Director

May 4, 1979

Dr. David C. Gardner, Chairman
School of Education
Boston University
765 Commonwealth Avenue
Boston, MA 02215

Dear Dave:

We will be very pleased to have you and Dr. Grace Joely Cowan visit us on Wednesday, May 23, at 11 a.m. I also enjoyed my visit to Whittier and meeting you and the staff people that have worked on the project HIRE. I have been asked by the Bureau of Vocational Education to give a brief presentation to the vocational directors this month concerning the project.

As you mentioned when we first met that your philosophy leaned toward a comprehensive high school, I am sure you will be interested in ours.

Again, I will be looking forward to seeing you on the 23rd.

Sincerely,

Ken Jordan

Kenneth C. Jordan
Vocational Director

KCJ/mjl

"An Equal Opportunity Employer."

ROBERT L. BRUNELLE
COMMISSIONER
NEAL D. ANDREW, JR.
DEPUTY COMMISSIONER

DIVISION OF
VOCATIONAL-TECHNICAL EDUCATION
105 LOUDON ROAD, BLDG. 3
CONCORD, N. H. 03301

STATE OF NEW HAMPSHIRE
DEPARTMENT OF EDUCATION

April 13, 1979

Dr. David Gardner
Associate Professor & Chairman
Department of Business and
Career Education
Boston University
School of Education
765 Commonwealth Avenue
Boston, MA 02215

Dear Dr. Gardner:

Thank you and Dr. Cowan for acquainting certain members of our staff with Project HIRE and the materials developed in connection with it. It is their opinion that these materials would be helpful to teachers in New Hampshire in providing better programs for handicapped students.

The purpose of this letter is to accept your offer to meet with the Vocational Directors of New Hampshire's Twenty Area Secondary Vocational Centers on Thursday, October 18, 1979.

I look forward to having you with us, and I am sure it will be a profitable experience for the directors.

Sincerely,

Bill Porter

G. William Porter
Deputy Chief

GWP:rff

EQUAL OPPORTUNITY EMPLOYER – EQUAL EDUCATIONAL OPPORTUNITIES

"Live Free or Die"

Waterville Regional Vocational Center

Brooklyn Ave. Waterville, Maine 04901 Tel. 873-2751

William N. Rowland
Director

Deborah H. Carroll
Coordinator
Student Services

October 30, 1979

Dr. David Gardner
Associate Professor
Department of Business and Career Education
Boston University School of Education
765 Commonwealth Ave.
Boston, MA 02215

Dear Dr. Gardner:

The presentation that you and Dr. Grace Joely Cowan made on PROJECT HIRE at the Maine State Vocational Director's Meeting on Wednesday, October 24 was extremely informative. I gained some very practical information from you relative to dealing with special needs students in vocational education. Also, I am extremely impressed with what you are doing because it is this type of approach that we are attempting in Waterville.

I quickly mentioned to you that I was in need of a staff member for a handicapped project which we have funded. Do you know of an individual that has experience or has been prepared to work with handicapped students and is familiar with vocational education who would like to move to Maine. We are desparately in need of such an individual. If you should know of any possible candidates please have them contact me at the following address: William N. Rowland, Director, Waterville Regional Vocational Center, Brooklyn Avenue, Waterville, ME 04901, as soon as possible.

During the presentation you were going to present some strategies for changing an individual with an external locus of control to an internal locus of control, if you have any information on this I would greatly appreciate receiving it. Also, how would I acquire the curriculum materials which you and Dr. Cowan are currently developing?

Thank you for your assistance.

Sincerely,

William N. Rowland

William N. Rowland
Director

WNR:ce

APPENDIX A

SAMPLE TEACHER'S MANUAL

CULINARY ARTS

TEACHER'S MANUAL

TABLE OF CONTENTS

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E. "Master" Copies of ACTIVITIES and CHECKUPS . . . . . Pocket

TEACHER'S MANUAL

I. INTRODUCTION

In our modern technological society, the beginning worker must master the core vocabulary of the job in order to communicate effectively with fellow workers, employers and customers. Many learning handicapped students have problems learning the language of the trade and thus may experience difficulty or even failure on the job. The purpose of this series of modules is to assist the learning handicapped student to master this core vocabulary.

The materials in this series were developed by interdisciplinary teams of vocational teachers, special education teachers and university faculty. The materials have been field-tested and refined. They are designed to help students who have learning problems master the core vocabulary of a specific vocational area. The modules are <u>not intended</u> to teach the student how to perform a task. They are meant to familiarize and reinforce the <u>basic vocabulary</u> taught in the trade. The words contained in each set of modules have been validated by a sample of employers on the following bases:

1. The words should be in frequent or moderate usage.
2. The words must be essential for job success for the beginning worker.

The modules are designed so that students, using the tapes that accompany each set, can work with minimal supervision, alone or in small groups. Each module is constructed so that it can be used by a resource room teacher who may have limited knowledge about the vocational area.

These materials are to be used as supplements to the on-going instruction in the vocational program.

The materials for each set of modules are:

1. Teacher's Manual which includes:
   a. Supplementary learning activities
   b. Progress checks
2. Three Picture Dictionary booklets, with accompanying tapes
3. Flash Cards

II. QUESTIONS AND ANSWERS

1. When should the materials be used?	1. To provide supplemental instruction for special needs students who are having difficulty with technical terminology.
2. Do the materials include all the technical vocabulary in the trade?	2. No. Vocabulary words are primarily for entry-level jobs.
3. Do the materials teach a student how to perform a specific task?	3. No. The materials do not teach process. The purpose is to give students additional instruction and understanding of vocabulary.
4. Can a special education teacher use this series without special training?	4. Yes. The series has been designed for regular, special and resource room teachers.
5. How do I begin?	5. Familiarize yourself with the materials. Then pretest. Select the appropriate booklet. Assist student with Lesson 1. Most students can work alone with minimum assistance.
6. What extra materials will I need?	6. A cassette tape player. All other materials are provided in the packet.
7. Can this series be used for group instruction?	7. The materials will work best if used by students working individually or in small groups.
8. Can I alter the recommended sequence?	8. Yes, alteration of the sequence to individualize instruction is appropriate.

9. How about evaluation?

9. Activity sheets are included at the end of each lesson. Progress checks are also included for each lesson.

III. STUDENT OUTCOMES

This series is designed to maximize success and minimize failure. Students should not be penalized for requiring numerous trials in order to reach the established criterion of 100% correct on the activity checks. Some students will master the individual lessons in one or two trials. Others will require more trials to criterion. REMEMBER, these materials were designed to help every student reach mastery!

After completing the series, the student should be able to:

1. Match each word/illustration to the appropriate definition.
2. Match each illustration to its appropriate definition.
3. Match each illustration to the appropriate word.

IV. CORE VOCABULARY

The following pages contain an alphabetized list of the terms in this series.

V. TEACHING SUGGESTIONS

A. Explanation

The materials prepared for these units have been designed to take advantage of certain principles of learning that are well known to teachers. Among principles used in preparation for these materials are:

1. Learning is faster if materials are meaningful to students.
2. Learning is maintained best if learned material is used soon after it is learned.
3. For facts, learning is faster and better retained if practice is distributed during the learning time (rather than "crammed.")

CULINARY ARTS

Alphabetical Index

Vocabulary Word	book	Page
a la mode	III	158
ambrosia	III	154
arrowroot	III	131
as purchased (A.P.)	I	33
baba au rhum	III	151
bake pan	II	88
baker's scale	I	28
baked alaska	III	152
baste	III	141
batter	II	71
bechamel sauce	III	129
bench brush	II	92
bisque	III	110
blanch	II	75
blend	I	35
bombe	III	155
boning knife	I	15
bouillabaisse	III	107
bouillon	III	106
box grater	I	5
braise	II	74
broche	III	134
broth	III	105
Brown Betty	III	153
burch (bch.)	I	30
butcher's knife	I	14
cacciatore	III	139
candy	II	68
caper	III	144
celcius (C)	I	32
chick peas	III	117
china cap	I	51
chop	I	2
clarify	II	65
coat or dredge	II	70
coddle or poach	II	67
colander	I	49
consomme	III	108
convection oven	II	99
conventional oven	II	101
crepe	III	159
deep fat fryer	II	80
deep fat frying	II	79
deglaze	II	69
deviled	III	122
dice	I	4

Vocabulary Word	Book	Page
double boiler	II	61
dough cutter	II	90
dress	III	145
drippings	III	142
duchess potatoes	III	114
dust	II	93
eclair	III	160
Egg wash	II	94
Eggs Benedict	II	86
emulsify	I	36
en brochette	III	135
escarole	III	118
espagnole sauce	III	127
farenheit (F)	I	31
filet	III	137
filet mignon	III	141
flambe	III	156
flapjacks	II	85
flat spatula	I	43
florentine	III	120
flour sifter	I	48
fluff	II	92
fold	I	34
food tongs	II	57
french knife	I	13
french toast	II	83
french wire whip	I	42
fricassee	II	73
fritters	II	84
fumet	III	113
gallon (gal.)	I	27
giblet	III	138
glaze	III	148
grate	I	6
grill	II	82
gumbo	III	109
hand meat tenderizer	III	150
hollandaise sauce	III	124
hominy	III	115
hotcake/meat turner	II	56
Indian pudding	III	162
ingredient	I	16
Irish stew	III	140
iron skillet	II	78
julienne	I	9
kitchen fork	II	58

Vocabulary Word	Book	Page
knead	I	37
level	I	18
lyonnaise	III	121
marinade	I	38
measure	I	19
measuring cup set	I	20
meringue	III	147
microwave oven	II	100
mince	I	3
mirepoix	III	112
mixing machine	I	44
O'Brien	III	123
offset spatula	II	55
ounce (oz.)	I	24
pack	I	17
paring knife	I	12
pastry bag	II	96
pastry brush	II	95
pastry tubes	II	97
perforated ladle	I	52
perforated spoon	I	53
piano wire whip	I	41
pie & cake marker	II	98
pint (pt.)	I	25
pound (lb.)	I	29
quart (qt.)	I	26
rasher	III	143
reach-in refrigerator	II	102
rice	I	8
rissoled	III	147
rolling pin	II	89
roux	III	132
sauce pan	II	63
sauce pot	II	62
saute	II	76
saute pan	II	77
scald	II	66
scoop	I	21
score	I	10
sear	II	72
shallot	III	116
shirred eggs	II	87
shred	I	7
sieve	I	45
sift	I	46
simmer	II	59
skewer	III	133
skimmer	I	54
slice	I	1
slicing machine	I	11
solid ladle	I	40
solid spoon	I	39
spit	III	136
steam	II	64
steam table	II	104
stock	III	125
stock pot	II	60
strain	I	26
strainer	I	50
suet	III	140
tablespoon (T)	I	23
teaspoon (t)	I	22
tilt fryer	II	81
tomate sauce	III	128
truss	III	146
veloute sauce	III	126
walk-in refrigerator	II	103
white wash	III	130
zest	III	119

4. Correct practice on recently learned materials increases retention.
5. Clustering facts to be learned improves retention.
6. Sequencing of materials to be learned improves learning speed; easy material first and difficult material later.
7. Overlearning (review) helps retention.
8. Knowing a part of the task prior to attempting the entire task can aid students to learn.

B. Procedures for Use of Materials

Because the materials have been developed with the principles cited above, it is requested that teachers use them as designed. Changes such as using Module II before Module I are appropriate if such change provides better coordination with vocational instruction. Using a part of Module I and a part of Module II, and selecting parts of workbooks to go with selections would not be appropriate, even if the teacher believed the student already knew some of the vocabulary items in a particular module; it is important for the student to find some of the words "too easy" along with the "too hard" ones; this can keep the student at work on a task that might otherwise be abandoned as too difficult. Furthermore, practice on materials the student already knows can aid in ensuring retention.

C. Steps in Using Materials

1. Getting the Student Started

a. Make sure the tabs at the top of the cassette tape are punched out to prevent accidental erasure.

b. Take the students to a table in a quiet area with the tape recorder, the flashcards, and the picture dictionary book(s).

c. Be sure that the student knows: (1) how to insert the tape; (2) how to follow directions that are written in the dictionary and provided on the tape, and (3) how to use the small book. Show the student the box of flashcards so that they can be used when needed.

2. Explanations to Student

a. Keep them at a minimum. Simply say in your own words that these materials are designed to help students learn technical vocabulary.

b. Let the student know that you are aware that some words will be "too easy" and some "hard" but that you expect all to be done.

c. During the first session for each student, observe for a few minutes to ensure that the student does not fail because of misunderstanding of the simple procedures for using the materials.

3. Letting Student Study

Go about one or more of your other numerous tasks until the student comes to tell you the words are learned.

4. Activity Sheets

a. Make sure the student understands how to do the ACTIVITY. After the explanation, the student should complete the pages ALONE without any help from you or the other students.

b. Check the student's ACTIVITY sheets. If the score is 100% correct, go to 4c below. If the score is less than 100% correct, ask the student to use the tape and booklet again, doing the flashcards again also.

c. If the student was 100% correct on the ACTIVITY, give the CHECK UP sheets for the relevant lessons. Make sure student understands the directions. Again, students should work ALONE.

d. With the student watching, correct any errors on the CHECKUP SHEETS. Scores should be almost all correct if the ACTIVITY was 100% correct. If there is still trouble, the student probably needs to review the tape/booklet materials some more and then take the CHECKUP again.

Answer Keys
to
Activity Pages
and
Checkup Pages

pp. 9 - 76

TEACHER'S MANUAL

APPENDIX A

PROJECT DESCRIPTION AND PERSONNEL

Project HIRE

PROJECT NUMBER: 498AH70309

PROJECT TITLE: A Curriculum Management System for Instructing the Handicapped (Project HIRE)

GRANT PERIOD: August 15, 1977 to June 30, 1979

PROJECT PERSONNEL:

Dr. David C. Gardner, Director
Chairman, Department of Business and Career Education
Boston University

Dr. Grace Joely Cowan, Associate Director
Senior Research Associate, Department of Business and Career Education
Boston University

Dr. Sue Allen Warren, Project Psychologist
Chairman, Department of Special Education
Boston University

UNIVERSITY STAFF:

Robert Cunningham, Research Assistant
Sheila A. Glynn, Administrative Assistant
Kim R. Gordon, Senior Research Assistant
Jeanne M. Griffith, Secretary
Mary L. Higgins, Senior Research Assistant
David M. Smith, Research Assistant

CURRICULUM TEAMS:

Blue Hills Regional Vocational Technical High School
Sidney Barnsley
William J. Coughlan
Ronald F. Linari

Joseph P. Keefe Technical School
Robert Leonard
James Lynch
Stephen J. McIntosh
William A. Walden, Sr.

Minuteman Regional Vocational Technical School
Janis Broskie
Helen T. Gillam
Richard H. Lee
Gerald H. Less
Pamela A. McInness
James Amara
Nancy McGrath

Whittier Regional Vocational Technical High School
Margaret DeRoche
Nellie Fichera
Kim R. Gordon
Mary L. Higgins
George A. Korn
Patricia Lavin
C. William Leuders

PROJECT OBJECTIVES

The purpose of the project was to develop a curriculum management system for instructing handicapped students enrolled in vocational high schools. A team from each of four vocational technical high schools, consisting of two special needs or resource-room teachers, two vocational teachers, and the director of special needs, worked with university personnel to develop materials in specific vocational areas. Project objectives were to:

1. Develop and test new strategies and standards for utilizing teams of vocational education and special education personnel, supported and directed by university specialists, in the planning, development, and testing of curriculum materials for use in resource rooms as back-up instructional materials for the regular vocational program.

2. Design, develop, field test, and refine these curriculum materials.

3. Disseminate both nationally and locally the findings of the project, including the materials and a description of the management process.

PROJECT PRODUCTS

1. Final Report
2. Curriculum Management Handbook
3. Curriculum Materials

1) Module Areas:

Allied Health
Teacher's Manual
Student Dictionaries #1, #2, #3

Arc Welding
Teacher's Manual
Student Dictionaries #1, #2, #3

Culinary Arts
Teacher's Manual
Student Dictionaries #1, #2, #3

Graphic Arts
Teacher's Manual
Student Dictionaries #1, #2, #3

Upholstery
Teacher's Manual
Student Dictionaries #1, #2, #3

2) Cassette Tapes for Each Lesson

3) Flash Cards

TEACHER'S MANUAL

APPENDIX B

SUMMARY OF FIELD TESTING

SUMMARY OF FIELD TESTING

Five regional vocational technical high schools in Massachusetts participated in the preparation and field testing of the Project HIRE materials in the following trade areas: (1) Allied Health, (2) Arc Welding, (3) Culinary Arts, (4) Graphic Arts, and (5) Upholstery.

A total of 87 students were involved in the field testing of the materials; 52 learning handicapped students, who received instruction with the Project HIRE materials, and 35 regular students enrolled in the same vocational programs who were used as a comparison group. The regular students did not use the HIRE materials but received the same instruction in the vocational shop.

Both the learning handicapped students and the regular students took the same vocabulary tests at the beginning of the field testing period. The learning handicapped students then used the HIRE materials in addition to receiving the in-shop and related instruction with the regular students. Both groups were tested again on the same vocabulary terms at the end of the field testing period. The learning handcicapped students made statistically significant progress on the vocabulary words while the regular students did not. There were significant differences between the two groups, with 65% of the learning handicapped students achieving 100% mastery of the terms while none of the regular students achieved 100% mastery.

Of the learning handicapped students, both learning disabled students and educable mentally retarded students made significant gains on the number of words mastered although more learning disabled students reached 100%

mastery. Most of the learning handicapped students were able to get 100% on a lesson with less than 2 trials; however, the educable mentally retarded students sometimes needed more trials.

A complete and detailed analysis of the field testing procedures and findings is contained in Volume I of the Final Report of Project HIRE, entitled Vocational Curriculum Modification: Teaching Technical Language to Learning Handicapped Students. In addition, a complete description of the curriculum management system used to develop the materials is contained in Volume 2 of the Final Report of Project HIRE, entitled Practical Approaches to Curriculum Development: A Management Handbook. Both volumes are available through the ERIC system and are listed in Resources in Education

TEACHER'S MANUAL

APPENDIX C

OCCUPATIONAL INFORMATION AND ENTRY-LEVEL JOBS

APPENDIX C

OCCUPATIONAL INFORMATION IN CULINARY ARTS[1]

Occupational Outlook

The employment outlook for dishwashers and dining room attendants into the next decade is encouraging. The employment for dining room attendants is expected to increase at a faster rate than the growth for all occupations. For dishwashers, growth is expected to be about average through the mid-1980's.

The employment for food counter workers is predicted to be plentiful in the coming decade. Because of high turnover, jobs in this field are relatively easy to find. The growth in employment for food counter workers is expected to be higher than the average for all occupations.

The job market for waiters and waitresses is expected to grow at an average rate through the mid-1980's. Beginners will have their best opportunity for job procurement in the thousands of small restaurants. In the more expensive and exclusive restaurants, the competition for jobs will be greater.

For the more advanced student who has the opportunity to seek advanced training and/or apprenticeships, the occupational outlook for cooks and chefs is excellent. The number of job openings is expected to increase at a rate faster than the average for all occupations during the next five years.

---

[1] U.S. Department of Labor, Bureau of Labor Statistics. Occupational Outlook Handbook, 1978-79 Edition. Bulletin No. 1955.

APPENDIX C Continued

Entry-Level Positions

This section contains an alphabetical list of entry-level positions with short job descriptions and D.O.T. codes.[1]

JOB TITLE	D.O.T. CODE	DUTIES
Counter Attendant	311.477-014	1. Serves food at counter. 2. Calls order to kitchen. 3. Picks up order and serves. 4. Makes out check. 5. Accepts payment. 6. May prepare food (e.g. short order). 7. May perform other duties (see D.O.T.).
Waiter/Waitress Informal	311.477-030	1. Serves food at counters, tables in coffeeshops, lunchrooms, etc., where service is "informal." 2. Presents menu, answers questions, makes suggestions. 3. Writes order on check (may memorize order). 4. Relays order to kitchen. 5. Serves courses from kitchen and/or service bars. 6. Observes customer to fulfill additional requests; to note when finished meal. 7. Totals bill; may accept payment or refer to cashier. 8. May ladle soup, brew coffee, toss salads, etc. 9. May clear counter/tables and reset.
Cook Apprentice	313.361-018	See APPRENTICE (any ind) generic job description on following pages. Also refer to job descriptions such as Cook and Cook Helper in D.O.T.

[1] U.S. Department of Labor, Employment and Training Administration, Dictionary of Occupational Titles, Fourth Edition, 1977.

APPENDIX C Continued

JOB TITLE	D.O.T. CODE	DUTIES
Cook Apprentice, Pastry	313.381-018	See APPRENTICE (any ind) generic job description on following pages. Also refer to job descriptions such as Cook, Cook Helper in D.O.T.
Cook Helper, Pastry	313.687-010	1. Assists pastry shop workers. 2. Carries and distributes supplies and equipment. 3. Mixes, kneads, shapes dough or batter. 4. Washes and cuts fruits. 5. Greases pans; may line with wax paper. 6. Inserts products in oven and removes after baked. 7. Portions pastries, desserts and ice cream. 8. Washes and scours pots, pans, other equipment. 9. May perform other duties (see D.O.T. and HELPER generic job description on following pages).
Baker Helper	313.684-010	1. Assist baker. 2. Carries and distributes supplies (e.g. flour). 3. Mixes, kneadsor shapes dough. 4. Cuts dough into uniform pieces. 5. Greases pans; may line pans with wax paper. 6. Puts pans of dough in oven to bake. 7. Removes pans from oven. 8. Cleans utensils, equipment, work area. 9. May perform other duties (see D.O.T. and HELPER generic job description on following pages).

TEACHER'S MANUAL

APPENDIX D

ANNOTATED BIBLIOGRAPHY

ANNOTATED BIBLIOGRAPHY

This is an annotated bibliography of selected materials that can be used by a special education teacher to supplement general vocabulary and technical vocabulary instruction.

Vocabulary Materials in Culinary Arts

1. Food Services Glossary of Key Words Vocational Reading Power ESEA, Title III, Division of Vocational Education, Right to Read Program, Vocational Technical Curriculum Laboratory/Rutgers--The State University Bldg. 4103, Kilmer Campus, New Brunswick, NJ 08902

The Glossary is developed to help build the student's vocabulary comprehension within the technical program. The workbook provides vocabulary, syllabication, definitions at two different levels, as well as illustrative sentences. While there is a noticeable difference between the two definitions, both contain vocabulary above a fourth-grade reading level. Some teacher supervision would be required to make certain that the student understood the vocabulary used in the definitions.

2. Food Services Reading and Language Activities. William A. Kessman, Vocational Technical Curriculum Laboratory/Rutgers--The State University Bldg. 4103, Kilmer Campus, New Brunswick, NJ 08902

This workbook provides information at the exploratory level of a vocational program for Special Needs Students in food services utilizing language arts skills. The material addresses reading comprehension, vocabulary building, spelling, word recognition, and word usage. Areas of concern: What to wear, washing hands, setting a table, what is kitchen work, kitchen equipment. This material would be most helpful for lower level EMR students working in very basic jobs within food services.

3. Food Services Vocational Skills Record. Oregon Department of Education, Career and Vocational Education, Home Economics Specialist.

Student record cards for checking degree of competency attained in the major key occupations in the food service training program.

4. I Know - A Vocabulary Game for Culinary Arts. Vocational Technical Curriculum Laboratory/Rutgers--The State University Bldg. 4103, Kilmer Campus, New Brunswick, NJ 08902.

The game is played like the well-known BINGO game. It should be used after vocational instruction has been started and terminology is being introduced. Complete familiarity with the technical vocabulary is not necessary. The game provides a motivation for learning the terms as well as a repetitive reinforcing technique. However, many of the terms are beyond entry-level and the reading/listening comprehension level of the definitions is high.

General Vocabulary Materials

1. Across and Down. Scope/Word Skills 1. Readability 4.0 - 6.0. Scholastic Book Service, 904 Sylvan Avenue, Englewood Cliffs, NJ 07632.

Thirty-seven crossword puzzles that teach basic phonics and build vocabulary. Dictionary and table of contents included as well as abbreviations, spelling and punctuation rules.

2. Basic Reading Vocabulary Levels A and B. Filmstrips, workbooks, teacher's edition. Psychotechnics Inc., 1900 Pickwick Avenue, Glenview, IL 60025.

Level A presents 119 words necessary for reading skill achievement of 1.9. Level B presents 149 words necessary for reading skill achievement of 2.9. Exercise I contains the word list and introduces each word for primary recognition and discussion. Words are presented in sentences structured to develop word meaning. Exercise II reintroduces each word and provides for strong sight-meaning associations and overlearning. Exercise III contains a visual tracking exercise. Exercise IV contains the answers to the visual tracking test and provides a basis for sentence writing.

3. Building Basic English Programs. Language Master - 200 prerecorded cards, Bell & Howell, Audio Visual Products Division, 7100 McCormick Road, Chicago, IL 60645.

These materials can be used with almost any grade level in a variety of subject areas. Set A provides a 200 card "Noun and Everyday Thing" set from the Word-Picture Program and a Usage Manual and blank cards. Set B contains a complete 600 card phonic series with word building and word anslysis techniques. The set also includes 90 blank cards, a usage manual, and a program organizer file.

4. English Development Program Set III - Industrial Supplement. 200 prerecorded cards; readability 4.0 - 6.0. Bell & Howell, Audio Visual Products Division, 7100 McCormick Road, Chicago, IL 60645.

A set of 200 cards for use at Junior and Senior High School levels; also for adults in literacy programs and for those learning English as a second language.

5. The Kaleidoscope Readers. Field Educational Publications. Eight different books with five copies of each and a teaching guide for each.

The series range from second grade reading level to ninth grade. Materiasl present high interest level material. Development of skills include: word attack, vocabulary skills, comprehension skills, study skills, and others.

6. Mast Materials. Mast Development Company, Educational Systems Division, 2212 East 12th Street, Davenport, IA 52803, Individual cassettes for Mast Programmed Reader.

Programmed materials to be used with Mast Programmed Instructor. Subject matter includes dictionary skills, vocabulary building, reading skills, 300 commas, spelling, punctuation, and English for the Spanish speaking.

7. Motorcycle Motorcross, Horses Trail Ride, Dune Buggy Rally. Bowmar, 622 Rodier Drive, Glendale, CA 91201. Two games in each area.

Games to use with the Reading Incentive Program (#10 on this list) to reinforce vocabulary. Two to six players.

8. The New Diagnostic Reading Workbooks - Looking Ahead - Grade 6B. Merill Publishing Company, 1300 Alum Creek Drive, Columbus, OH 43216. Workbooks, 6 copies.

Checking and reinforcement of the reading skills emphasized by basal reading programs. Materials provide a progressive learning pattern as well as graduation of lessons according to difficulty. The exercises center around the following skills: fact comprehension, vocabulary development and word mastery, ability to follow directions, extracting main ideas, and independent thinking and evaluation. Materials range from first to sixth grade levels.

9. Reader's Digest New Reading Skill Builder. Reader's Digest Services, Educational Division, Pleasantville, NY 10578. Books and cassettes. Primary, Intermediate (2-6), Advanced (4-10).

Each skill builder contains controlled readability selections, that are illustrated with full color drawings and photographs as well as exercises and questions. The exercises measure comprehension and interpretation, critical and creative reading, word study, vocabulary and other skills appropriate to grade level.

10. Reading Incentive Language Program. Bowmar, 622 Rodier Drive, Glendale CA 91201. 16 kits, 10 books, 1 filmstrip, 1 cassette, and 1 teacher's guide in each kit.

A low-level vocabulary reading program based on high interest themes to involve the "turned off" student and to provide sequential skill development. Interest levels 3-12th grade. Readability 3.0-5.0.

11. Vocabulary Builder Program - Sets I, II, and III. Bell and Howell Audio Visual Products Division, 7100 McCormick Road, Chicago, IL 60645. 200 prerecorded cards in each set.

Basic, intermediate, and advanced sets may be used from the fourth grade through college level. Each set contains the words to be learned, definitions, and correct pronunciation. Alternate dictionary pronunciations are printed on the front of the card.

12. Word Puzzles and Mysteries. Scope Word Skills 2/Scholastic Book Service, 904 Sylvan Avenue, Englewood Cliffs, NJ 07632. Readability 4.0 - 6.0.

A paperbound exercise book with 20 crossword puzzles and 15 word games to develop vocabulary and reinforce spelling. Sixteen mystery stories use the close method of filling blanks to develop stronger identification of the parts of speech.

Prepared by:
Kim Gordon
Research Assistant, Project HIRE

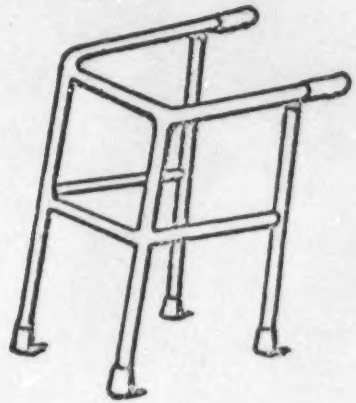
APPENDIX B

SAMPLES OF BOOKLET PAGES

FROM FIVE TRADE AREAS

ambulatory

Ambulatory means that the patient is able to walk.



walker

A walker is a metal frame that a person uses for help in walking. The walker supports the person as he walks.

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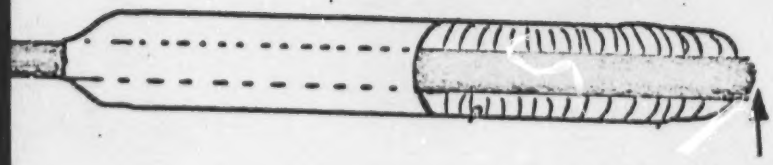
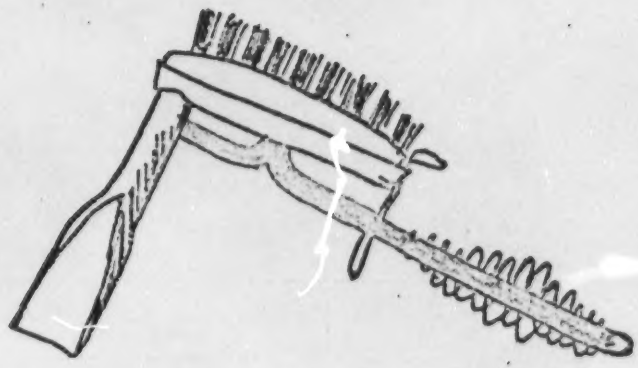


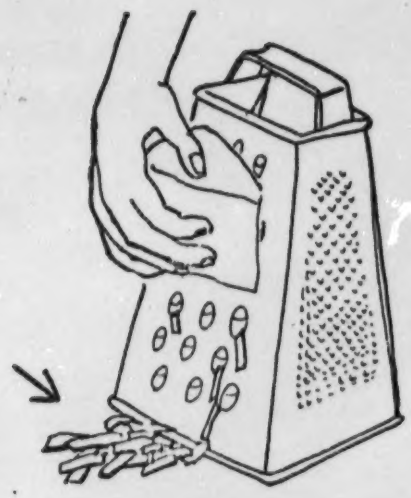
filler metal

Filler metal is the inside of an electrode. Electricity melts the filler metal and it becomes part of the weld.



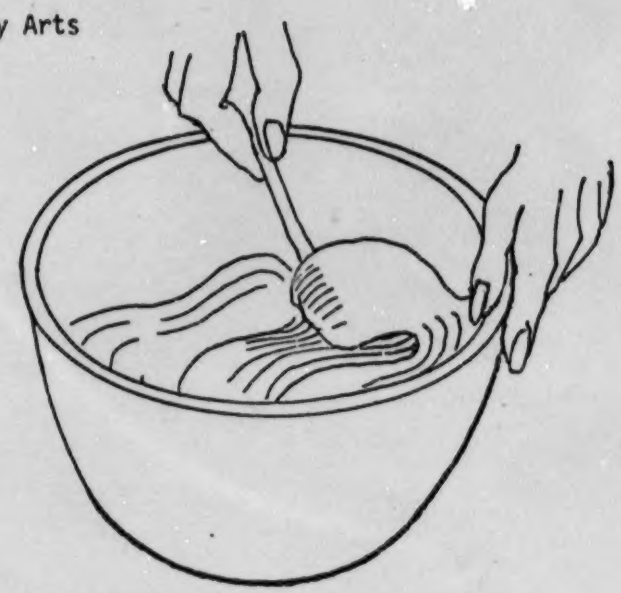
hand chipping hammer

A hand chipping hammer is a tool used to remove slag from a finished weld.



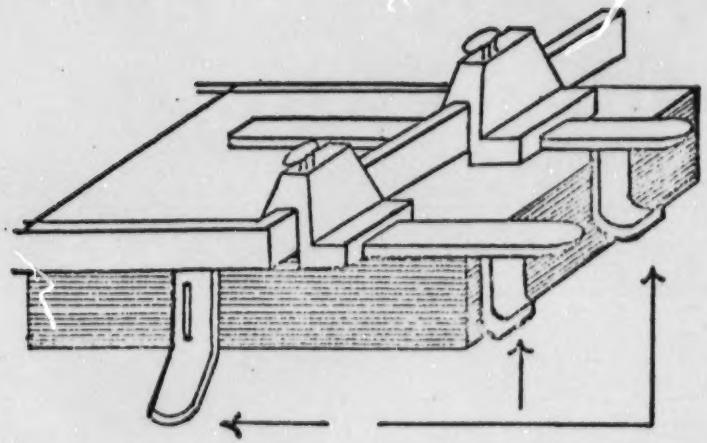
grate

Grate means to rub pieces of food against the rough surface of a grater.



fold

Fold means to gently mix something in. Move the spoon like a slow wheel turning over and over.

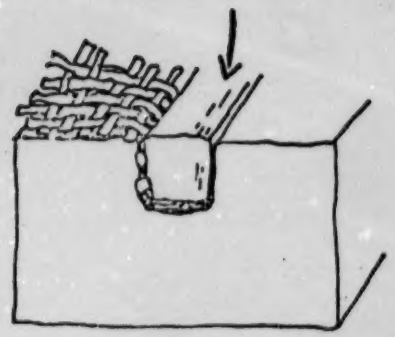


pile guides

Pile guides are bars that hold the pile of paper straight in the feeder. You can move the pile guides to hold different sizes of paper.

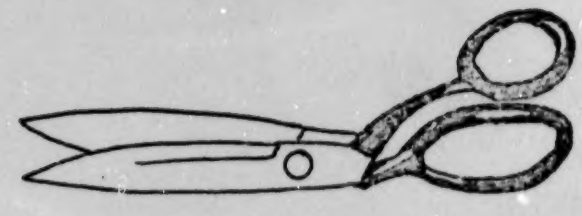
printing plate

The printing plate contains the material that is to be printed. A plate can be made of metal, plastic, or paper.



spline

Spline is a long strip of wood that looks like a stick. It comes in different widths and can be as long as 12 feet. Spline is used to fasten web caning to the chair frame.



shears

Shears are large scissors. Upholstery shears have straight blades. The handles stick up so that the shears can be used on a table.

This research was supported by a grant from the U. S. Office of Education, Department of Health, Education and Welfare (Grant No.. G00771947). The opinions expressed herein do not necessarily reflect the position or policy of the U. S. Office of Education, and no official endorsement by the U. S. Office of Education should be inferred.

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